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L'EXPLORATION DE LA MER

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ET

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VINGT ET UNIÈME RÉUNION

COPENHAGUE — JUIN 1928

BUREAU DU CONSEIL:

M. H. G. Maurice, Président du Conseil.
M. Otto Pettersson, Vice-Président du Conseil.
M. J. Hjort, Vice-Président du Conseil.
M. Théodore Tissier, Vice-Président du Conseil.
M. C. Heinrici, Vice-Président du Conseil.

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et leurs adresses:

Allemagne: M. le Dr. C. Heinrici, Secrétaire d'Etat à disposition, Président de la Commission scientifique allemande pour l'Exploration de la Mer, Potsdamerstrasse 22a, *Berlin, W. 9.*

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* Empêché d'assister à la réunion.

Danemark: M. le Dr. Martin Knudsen, Professeur à l'Université, Polyteknisk Læreanstalt, *Copenhague.*

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Espagne: M. le Professeur Odón de Buen, Directeur Général du Service des Pêches et de l'Institut espagnol d'Océanographie, Professeur de Biologie à l'Université de Madrid, Président de la Section d'Océanographie à l'Union Internationale Géodésique et Géophysique, Alcalá 31, *Madrid.*

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M. le Dr. Fernando de Buen, Chef de la Section de Biologie de l'Institut espagnol d'Océanographie, Alcalá 31, *Madrid.*

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M. le Dr. R. Witting, Professeur, Directeur de l'Institut pour l'Exploration de la Mer, *Helsingfors.*

Expert: M. le Dr. K. Buch, Chef de la Section chimique de l'Institut pour l'Exploration de la Mer, *Helsingfors.*

France: M. Théodore Tissier, Président de Section au Conseil d'Etat, Président du Conseil d'Administration de l'Office Scientifique et Technique des Pêches Maritimes, Vice-Président du Conseil International, 13, rue Monsieur, *Paris.*

M. G. Lecourbe, Directeur des Pêches Maritimes au Ministère des Travaux Publics, 24, rue du Boccador, *Paris.*

Experts: M. le Dr. Ed. le Danois, Directeur de l'Office Scientifique et Technique des Pêches Maritimes, Secrétaire Général de la Commission de la Méditerranée, 3, avenue Octave Gréard, *Paris.*

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Mr. DAVID T. JONES, C. B. E., F. R. S. E., Chairman of the Fishery Board for Scotland, *Edinburgh.*

Experts: Professor D'ARCY W. THOMPSON, C. B., F. R. S., The University, *St. Andrews.*

Dr. E. S. RUSSELL, Director of Fishery Investigations, 43, Parliament Street, *London.*

Mr. J. O. BORLEY, O. B. E., "Discovery Committee", Colonial Office, 2 Richmond Terrace, *London S. W.*

Dr. A. BOWMAN, F. R. S. E., Scientific Superintendent, Fishery Board Laboratory, *Aberdeen.*

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Mr. T. EDSER, 43, Parliament Street, *London.*

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**S. E. l'Amiral PAOLO THAON DI REVEL, *Rome.*

Experts: **M. le Professeur MARIO PICOTTI, *Trieste.*

**M. le Professeur G. BRUNELLI, Ministère de l'Economie Nationale, *Rome.*

Lettonie: †M. V. MIEZIS, Ministère d'Agriculture, *Riga.*

Norvège: M. le Professeur JOHAN HJORT, à l'Université, *Oslo.*

M. S. K. ASSERSON, Directeur des Pêches, *Bergen.*

* Empêché à cause de maladie.

** N'a pas assisté à la réunion.

† Empêché à cause des obligations de service.

Experts: M. Oscar Sund, Laboratoire du Dir. des Pêches, *Bergen.*
M. Einar Lea, Laboratoire du Dir. des Pêches, *Bergen.*
M. Johan T. Ruud, *Oslo.*
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M. P. M. van Riel, Directeur-adjoint, Chef de la Section d'Océanographie et de Météorologie maritime de l'Institut Royal Néerlandais Météorologique, *de Bilt.*

Pologne: M. Michel Siedlecki, Professeur de Zoologie à l'Université de Cracovie, *Cracovie.*
M. Joseph Borowik, Vice-Directeur de l'Institut Scientifique d'Economie Rurale, 8, Zacisze, *Bydgoszcz.*

Portugal: *M. le Contre-Amiral Augusto Ramos da Costa, Direction d'Hydrographie, Ministère de la Marine, *Lisbonne.*
M. le Dr. Alfredo Sobral Mendes de Magalhaes Ramalho, Aquario Vasco da Gama, *Dafundo.*

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M. le Dr. Gustaf Ekman, Södra Hamngatan, 11, *Göteborg.*
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M. le Professeur V. W. Ekman, à l'Université, *Lund.*
M. le Dr. A. Molander, *Lysekil.*

Invités: Société des Nations, Comité Economique:
**Sir Sidney Chapman, K. C. B., C. B. E., Chief Economic Adviser to the British Government, *London.*
†M. N. Ito, Conseiller d'Ambassade, Directeur Adjoint du Bureau Impérial du Japon auprès de la Société des Nations, *Paris.*
M. G. Jahn, Directeur en Chef du Bureau Central de Statistiques de Norvège, *Oslo,* accompagné par MM. P. Stoppani et C. Smets, du Secrétariat de la Société des Nations, *Genève.*

* N'a pas assisté à la réunion.
** Empêché à cause des obligations de service.
† Empêché à cause de maladie.

AGENDA

for the twentyfirst meeting of the International Council for the Exploration of the Sea.

1. Opening of the Proceedings by the President.
2. Report as to the present participation.
3. Administrative Report.
4. Final Approval of the Accounts for 1926—1927.
5. Statement of Accounts for 1927—1928.
6. Arrangements for scientific meetings and adjustments, if any, of the circulated programme of proceedings.
7. Consideration of a proposal of the Belgian Government that contributions of the participating countries should be proportionate to the magnitude of their interests respectively in fisheries.
8. Consideration of Reports and Programmes of the Committees (including Reports of extraordinary Committee meetings during the year).
9. Estimates for the financial year 1928—1929.
10. Nomination of the members of the Bureau, and the Finance Committee, and the Editorial Committee, and of the Editors, etc.
11. Time and place for the next Council Meeting.
12. Other business.
13. Conclusion of the meeting.

REPORT

of

the 21st Meeting of the Council.

First Sitting: Monday, June 4th, at 9,30 a. m.

The President, Mr. MAURICE, in the chair.
Present: The members and experts (vide list pp. 4—7).

Under **Point 1 of the Agenda** the President formally opened the proceedings in the following words:—

Messieurs les Délégués et Experts,

J'ai l'honneur de déclarer ouverte la 21ème session du Conseil International. Comme de coutume, je vous propose d'adresser à Sa Majesté le Roi de Danemark un télégramme exprimant notre gratitude pour l'hospitalité que nous recevons dans son royaume.

Depuis mon arrivée à Copenhague, j'ai en effet eu encore une preuve de la façon dont le Danemark a adopté notre Conseil. Au cours d'un entretien récent avec son Excellence le Comte REVENTLOW, directeur permanent du Ministère des Affaires Etrangères, j'exprimais mes remerciements pour la courtoisie du Gouvernement danois qui a mis à la disposition du Conseil pour nos séances plénières une salle du superbe palais de Christiansborg, et comme j'ajoutais que sans doute M. le Ministre des Affaires Etrangères nous recevrait comme ses hôtes, le Comte REVENTLOW me répondit: "Il n'y a pas dans ce palais à vous souhaiter la bienvenue, car vous êtes ici chez vous, à Copenhague". Et il est exact que nous nous ne sentons en effet pas des étrangers dans cette ville qui est le siège de notre Conseil. Ce sentiment ne nous fait pas oublier cependant, comment nous avons été reçu l'année dernière à Stockholm. Les cérémonies qui ont marqué le vingt-cinquième anniversaire du Conseil sont présentes dans nos mémoires à tous.

Cette année le nombre des délégués et experts du Conseil est particulièrement considérable et j'ai à souhaiter la bienvenue à beaucoup d'entre vous qui siègent pour la première fois dans nos réunions. Je salue particulièrement M. BOROWIK, délégué du Gouvernement polonais. Douze nouveaux experts sont venus apporter leur compétence scientifique aux débats du Conseil, en faisant partie des délégations allemande, anglaise, finlandaise, norvégienne et suédoise. Je leur souhaite à tous la bienvenue.

De plus, le Conseil est particulièrement honoré de la présence de ses hôtes, Messieurs les représentants de la Société des Nations. Leur présence constitue un grand éloge pour nous, et montre que nos travaux sont appréciés dans cette institution mondiale, au point de demander notre coopération à l'examen des questions importantes touchant l'exploitation rationelle des richesses de la mer.

Messieurs JAHN, SMETS et STOPPANI, au nom de tous les membres du Conseil International je vous souhaite la bienvenue.

Tout récemment un deuil nouveau a frappé la science danoise dans la personne de C. G. JOH. PETERSEN, que nous estimions tous comme un remarquable savant ayant su appliquer au domaine pratique ses vastes connaissances scientifiques. La nouvelle de sa mort nous a douloureusement frappés et nous offrons à ses compatriots l'expression de nos condoléances.

En terminant, je tiens à demander à nos collègues allemands de vouloir bien remercier la Société de Géographie de Berlin, qui a fêté recemment d'une façon si brillante son centième anniversaire, pour la réception cordiale que cette Société a bien voulu faire au délégué du Conseil, le Dr. HJORT, et lui permettre d'exposer devant un remarquable auditoire de savants, les grands problèmes des recherches internationales.

Il ne nous reste plus qu'à espérer que de même que la Société de Géographie de Berlin le Conseil International atteigne en pleine prospérité son centième anniversaire.

Point 2 of the Agenda. Report as to the present participation.

The President reported that, as regards participation there was no change. Fourteen Governments were represented on the Council as full members. Latvia continued to be a free member, but was not represented at the present meeting.

Point 3 of the Agenda. Administrative Report.

As the Administrative Report had only just been circulated, the President proposed to give an opportunity for comment upon it at the final meeting. It appeared to him to be a satisfactory report.

Point 4 of the Agenda. Final approval of the accounts for 1926—27.

The accounts for 1926—27 which had already been audited and had also been checked by the Finance Committee were finally approved.

Point 5 of the Agenda. Statement of Accounts for 1927—28.

The President stated that, as the accounts for 1927—28 had only just been circulated, he proposed to defer further consideration of them to the next meeting. There were considerable differences between the estimates and actual expenditures. The explanation was in every case simple, but he thought it desirable to circulate a brief explanatory note.

Point 6 of the Agenda. Arrangement for scientific meetings and adjustments, if any, of the circulated programme of proceedings.

The President informed the Council of the arrangements for holding the special scientific meetings and the meetings of the Southern North Sea Committee and the Combined North Sea Committee at the Polytechnic. No other question arose on the programme circulated.

Point 7 of the Agenda. Consideration of a proposal of the Belgian Government that contributions of the participating countries should be proportionate to the magnitude of their interests respectively in fisheries.

Consideration of this item was postponed at the request of M. BAELS, communicated by letter to the President.

Point 8 of the Agenda. Consideration of Reports and Programmes of the Committees.

The reports of the following Committees were laid before the Council and approved:—

Statistical Committee,
North Eastern Area Committee,
Plankton Committee,
Sub-Committee appointed to consider the question of the improvement of fishing gear.

The meeting was adjourned.

Second Sitting: Thursday, June 7th, at 2,30 p. m.

The President, Mr. MAURICE, in the chair.
Present: The members and experts (vide list pp. 4—7).

The President opened the meeting and stated that in accordance with the decision of the first sitting of the Council the following telegram had been sent to his Majesty the King of Denmark:—

"A Sa Majesté le Roi de Danemark.
Les membres du Conseil International pour l'Exploration de la Mer réunis à Copenhague demandent la permission de témoigner à Votre Majesté leurs sentiments les plus respectueux.

MAURICE, Président, Merexploration,
Copenhague."

in reply to which the following telegram had been received from the king:—

"Mes remerciements sincères.

CHRISTIAN R."

The President communicated to the Council a message addressed by telegram to Professor GILSON by Mr. BAELS, Minister of Agriculture in Belgium, expressing his regret that he could not attend the meeting and sending his greetings to the Council.

Point 3 of the Agenda. Administrative Report.

The President reminded the members of the Council that at the first meeting he had proposed to give them an opportunity for comment upon the Administrative Report at the final meeting. The Report was adopted without corrections.

Point 8 of the Agenda. Consideration of reports and programmes of the Committees.

The President said that for practical purposes it would be enough to pass the recommendations of the Consultative Committee which carried with it approval of the reports of Committees. The report of the Consultative Committee was then considered section by section.

Section 1. The Recommendation was adopted.

Section 2. With regard to this recommendation the President said that he would like to say a few words as to the implications of the recommendation. The effect of the recommendation, he thought, was that the Council welcomes the proposals of the Transition Area and Baltic Committees as an opportunity for an interesting experiment. He wished to emphasise the fact that the Council discusses such proposals only in their scientific aspect. Should these proposals be put into effect by means of a convention between the countries concerned, it would be most interesting to study the results. Recommendation 2 was adopted.

Section 3. The recommendations of all the Committees were adopted after the President had drawn attention to the expenditure involved. The new expenditure in support of recommendations of Committees proposed by the Bureau was:— (a) for experiments with fishing gears (Special Sub-Committee, recommendation I, p. 102) Kr. 5,000, (b) for illustrations of Atlantic Fauna (Atlantic Slope Committee, par. 13, p. 40) Kr. 3,000, (c) for preparation of Hydrographical Charts (Hydrographic Committee, par. X, p. 56) Kr. 900, (d) Publication of N.W. Area Report (Editorial Committee, par. VI, p. 80) Kr. 5,000, and (e) Reports of Scientific Meetings (Consultative Committee, par. 3, p. 28) Kr. 5,000.

With reference to the report of the Combined North Sea Committee the Bureau wished to suggest that Professor Gilson as Vice-Chairman should, having regard to the special duties he was requested to undertake, receive an honorarium of 2.000 Kr. and further that following the practice of the last two years the Council should pay to the Belgian Ministry of Agriculture the sum of 2.500 Kr. to be devoted to this special work. These proposals of the Bureau were adopted unanimously.

With reference to the report of the Hydrographical Committee the President pointed out that this report involved the cessation of the publication of the Bulletin trimestriel. One result would be that the appointment of Dr. Pettersson which under present arrangements would terminate on the 15th of September would not be renewed. Since Dr. Pettersson would thus lose his occupation, the Bureau wished to suggest that the Council should recognise the zeal and ability which he had displayed during the period of his service by granting him on the termination of his appointment an honorium of 5,000 Kr., being the equivalent of half of his present annual salary. This proposal was adopted.

Referring to the recommendation of the Committee that charts should be prepared by the Danish Meteorological Office showing the mean temperature of the Atlantic for the past 50 years Professor Pettersson raised the question of the use to which the charts were to be put. His idea in suggesting the preparation of these charts was that they should be used for the purpose of indicating on them from year to year deviations from the normal as illustrated by sample charts prepared by Dr. Pettersson. He wished to add to the report of the Hydrographical Committee a recommendation that provision should be made for the regular utilisation of the normal charts in this manner.

He observed that no resolution or recommendation had been taken in any

Committee — either the Hydrographical nor the Consultative — which demanded the cessation of the Bulletin Trimestriel. This would involve the cancelling of the resolution taken by the Council a year before in Stockholm:

"that the Bulletin Trimestriel should be continued possibly in a modified form, that is should contain text, tables, charts and diagrams as occasion arises and that it should contain material from the Baltic, the North Sea and the Atlantic."

The President said that he had already had some discussion with Professor PETTERSSON on this point. He assumed that when the Hydrographical Committee recommended the provision of these charts it was their intention that they should be used for some such purpose as Professor PETTERSSON suggested, but he understood that the precise arrangements had been left to further discussion. Since, however, Professor PETTERSSON was anxious that the charts should be put to the use suggested at the earliest possible moment he would be prepared to discuss with Professor KNUDSEN and others the possibility of an experiment on these lines during the present year which would furnish the material for future discussions.

Professor PETTERSSON expressed the wish to hear the views of other persons on the subject and pressed for a discussion for it at once.

The President suggested that such a discussion could be more appropriately carried on in the Hydrographical Committee and must therefore be referred to the next meeting of that Committee.

Dr. HJORT inquired whether these suggestions had been raised in the Hydrographical Committee and

Professor KNUDSEN replied that they had not.

The President said that he thought it would be unreasonable and indeed impossible to discuss the substance of the report of a technical Committee in full Council. The report of the Hydrographical Committee was a very carefully considered one and had been adopted by the Consultative Committee. It would be unreasonable for the Council to debate the Committee's proposal anew and he thought that with regard to this and other reports discussion in a full Council Meeting should be limited to the questions of finance and administration arising out of them.

Professor PETTERSSON said that, in deference to the President's wishes he would not press his view to a vote of the Council, but wished it to be understood that he was in disagreement with the proposal to accept the report of the Committee without amendment.

The proposals of the Whaling Committee were adopted with the reservation that the question whether a meeting of the Committee should be held before the next Council Meeting should be decided by the President in consultation with the Chairman of the Committee in the light of the replies received to the inquiries which the Council proposed should be addressed to the Governments concerned.

Section 4. The proposals in this section were adopted as a whole. With regard, however, to the proposal that a day should be allotted during next Council Meeting for the discussion of papers read at the special scientific meetings of this year, it was sug-

gested that when the programme of meetings is framed one day might be left free so that any special discussions or special meetings of Committees the need for which suggests itself during the course of the meeting could be arranged for that day. It was agreed that the provisional programme of the next Council Meeting should be discussed at the next meeting of the Bureau.

Section 5. The proposal that Mr. BORLEY should be retained as a member of the Consultative Committee was agreed.

A further recommendation of the Consultative Committee which did not appear in its report, having been discussed at the very end of the meeting, had been verbally communicated to the Bureau by Dr. HJORT, namely, that some financial provision should be made to facilitate the attendance of supernumerary experts for the special scientific meetings. On this point it was agreed that no definite regulation should be adopted for the present, but that authority should be given to the President and the Chairman of the Consultative Committee in consultation to call upon the Bureau to pay such expenses in respect to additional experts attending the present meeting as appeared to them to be justified.

The recommendations of the Editorial Committee (see p. 80) which do not come under consideration of the Consultative Committee were adopted. The adoption of these recommendations involves, in addition to the cost of publication, the following new expenditure:— (a) special expenses for library Kr. 800, and (b) preparation of an index of the Council's publications Kr. 400.

Point 12 of the Agenda. Other Business.

A number of subjects rose for consideration under this head as follows:—

a) A memorandum was submitted by the Bureau which they proposed to transmit to the General Secretary of the League of Nations. The memorandum was adopted after a brief discussion (see pp. 112—115).

Mr. Jahn thanked the Council for the invitation to take part in their annual meeting and expressed on behalf of his colleagues and himself their gratitude for the kindness they had been met with from the Bureau and the members of the Council. They had taken great interest in studying the working methods of the Council, and hoped that the co-operation set forth in the Memorandum of the Council would be a fruitful one.

b) The President read to the Council the following proposal of Prof. ODÓN DE BUEN with a reference to the exhibition of oceanographical and hydrographical instruments to be held in Seville next year:—

> Pour assurer la collaboration du Conseil dans l'Exposition d'instruments et dans le Congrès d'Océanographie et d'Hydrographie qui doivent avoir lieu à Seville en 1929, étant donné que le Bureau ne doit pas se réunir de nouveau avant cette date, on pourrait décider:
> 1) Désigner le Président du Conseil Mr. MAURICE pour assister au Congrès et à l'Exposition de Seville en représentation du Bureau.
> 2) Constituer une Délégation du Conseil à Seville sous la Présidence de Mr. MAURICE, avec tous les Membres du Conseil qui se trouveront à Seville pendant la réunion du Congrès et de l'Exposition.
> 3) Que le Bureau adresse à tous les Membres et Experts appartenant au Conseil, une

recommandation leur demandant de prêter leur concours, sous la forme la plus efficace possible, à l'Exposition et au Congrès de Seville.

4) Que le Bureau décide sous qu'elle forme il peut participer dans l'Exposition de Seville, p. e. en envoyant les publications et travaux realisés nécessaires pour signaler l'intensité de la tâche accomplie et les résultats pratiques acquis.

The Bureau had discussed this proposal and suggested that the Council should accord its warm thanks for the invitation to be represented and proposed that since the President had undertaken to represent the Council at the meeting of the International Commission for the Exploration of the Mediterranean Sea to be held at Malaga in April he should be designated to represent the Council also at Seville. The exhibition would be opened just after the meeting of the Mediterranean Commission and he could accordingly proceed from Malaga to Seville for the purpose. The President intimated that he would be very willing if circumstances permitted to act as representative of the Council. The Bureau suggested further that copies of the Bulletins and other publications of the Council might be furnished to Professor Odón de Buen with a view to his making such use of them in connection with the exhibition as he thought fit. With regard to the suggestion that the exhibition should receive the support of members and experts of the Council the Bureau preferred not to make any formal proposal but rather to let this question be the subject of unofficial arrangement between Professor Odón de Buen and his colleagues on the Council.

Professor Odón de Buen explained the scheme of the proposed exhibition at Seville. He pointed out that not only Spain and the Spanish speaking South American States would be represented there, but also the United States, Canada, and, as was hoped, other countries. It was proposed to make use of the occasion for the purpose of a great oceanographical Congress on which it was hoped that the Council would be officially represented by Delegates under the leadership of the President of the Council. He went so far as to suggest that the President of the International Council might preside over the suggested Congress and that the Council should itself take part in the exhibition to the extent of sending to it a selection consisting of instruments, photographs, charts, reports, etc. in order that the work of the Council might be made known as widely as possible.

The President replying on behalf of the Council thanked Professor Odón de Buen for his solicitude and expressed appreciation of his intention to secure recognition of the value and importance of the Council's work. He pointed out, however, that the Council was an official body with a limited mandate and he said that he did not feel that the mandate of the Council gave it authority to play an official part in such a Congress as was suggested. He thought that it would be better from every point of view that the visit of the President should be regarded as a simple visit of courtesy testifying the interest of the Council in the exhibition and its appreciation of the initiative of the Spanish Government. Otherwise he might at any moment find himself in the embarassing position of being asked to support resolutions or to enter into engagements on behalf of the Council to which however desirable they might appear to him personally, he could not properly lend himself without previous consultation with his colleagues.

Professor Odón de Buen having expressed his thanks to the President for the sympathetic way in which his proposal had been received by the Bureau, it was agreed that the President should represent the Council at the exhibition and that the question of supplying copies of bulletins etc. to be made use of in this connection, should be left to be arranged between him and Professor Odón de Buen.

c) At the request of Professor Odón de Buen the President referred to the resolution taken by the Council at its last meeting requesting Professor Odón de Buen to prepare a report on the effect of mineral oils discharged into the sea upon fisheries. Professor Odón de Buen had asked for information to be sent to him from different countries as to inquiries carried out and information secured in them respectively on this subject. But many of them had failed to supply the information. He therefore wished to renew his application for information in order that he might complete his report.

d) The President reminded the Council that the date of the final meeting synchronised with the opening of the new Geophysical Laboratory of the Bergen's Museum at Bergen and proposed on behalf of the Bureau that the following telegram should be sent to the Bergen's Museum:—

"The International Council for the Exploration of the Sea assembled at Copenhagen sends congratulations and best wishes for success of the new Geophysical Laboratory."

This proposal was adopted.

e) The President stated that considerable difficulty arose from the failure of persons who had undertaken to provide reports for publication to send them to the office in good time. It appears to the Bureau to be necessary to come to some definite arrangement as to the date at or before which all reports intended for publication should be received. This date ought to be not later than the end of February in order that all such reports might be certainly circulated before the Meeting of the Council. The Bureau suggested therefore that a date (to be announced later, but probably the first day of February) should be fixed for the return of manuscripts of all reports and that any authority for payment for the production or the printing of such reports should be cancelled automatically by failure to send it in by the prescribed date.

Point 9 of the Agenda. Estimates for the financial year 1928—1929.

The Estimates for the year 1928—1929 were adopted the President having informed the Council that they had been prepared so as to embrace all liabilities involved by the resolutions of the Committees and financial proposals submitted by the Bureau in anticipation of the Council's approval. There were certain explanatory notes to be added before the Estimates were finally printed in the Procès-Verbaux, otherwise they called for no special comment except as regards certain small modifications of their form and information included in them for the first time as to the interest on investments and the transfer of this interest to the Pensions Fund.

Point 10 of the Agenda. Nomination of the Bureau, and the Finance Committee, and the Editorial Committee, and of the Editors, etc.

The Bureau proposed that the two Danish Delegates for the time being should be permanent members of the Finance Committee in order that they being present at

Copenhagen might be able to verify the presence of all funds, securities etc. of the Council at the time of the annual audit. This proposal having been agreed, the President proposed that the total number of the Committee should be increased by one and on behalf of the Bureau proposed the appointment of the following members in addition to the President ex officio: Professor M. KNUDSEN, Professor JOHS. SCHMIDT, M. G. LECOURBE, Professor M. SIEDLECKI, Dr. A. RAMALHO. The Committee was elected accordingly.

The Editorial Committee with Professor O. PETTERSSON as Chairman was re-elected.

Professor D'ARCY W. THOMPSON and Dr. E. S. RUSSELL were re-elected as Editors of the Bulletin Statistique and the Journal respectively.

On the proposal of Professor SIEDLECKI seconded by Professor GILSON the Bureau was re-elected as a whole. The President briefly thanked the Council for the renewal of their confidence in the Bureau. He pointed out that the Bureau was a rather hard worked Committee, adding that all its members would gladly do anything within their power to secure the efficient activity of the Council.

Point 11 of the Agenda. Time and place for the next Council Meeting.

The question of time and place of the next Council Meeting was by general consent postponed to be discussed later by correspondence.

Point 13 of the Agenda. Conclusion of the Meeting.

The President proposed that the thanks of the Council be accorded to Professor PETTERSSON for the hard work, time and trouble he had expended on the production of the Rapport Jubilaire. He said that he knew that this had been, so far as Professor PETTERSSON was concerned, a labour of love, but he could from his personal experience testify that it had been a very hard labour indeed.

The President next referred to the forthcoming expedition of the "Dana" under the direction of Prof. JOHS. SCHMIDT. He said that although the Council could not claim the credit of the organisation of the expedition they took pride that the "Dana" would fly the Flag of the International Council which felt itself to be intimately associated with the aims and objects of this undertaking. He proposed that the Council should express its warm interest in the expedition and its good wishes that it might be crowned with success, at the same time congratulating Professor SCHMIDT upon his post as a leader of it. This proposal was adopted by acclamation.

Professor SCHMIDT thanked the President for his kind words and said that although it was a Danish expedition he would not forget that he carried the colours of the International Council and was pleased to carry them to the other end of the world.

The President next proposed a hearty vote of thanks to the Danish Government for their generous and unvarying hospitality, and in particular on this occasion for the arrangement made to hold the Council Meeting in the Foreign Office.

In conclusion on the proposal of the President a hearty vote of thanks was accorded to the staff for their indefatigable service in connection with the Committee Meetings, special Scientific Meetings and the Meeting of the Council as a whole.

ESTIMATE

of

the International Council for the Study of the Sea for the financial year 1928—29.

Receipts:—

Head	No.	Item	Kroner	Kroner
I	1	**Balance** on the 31st March 1928		203,881,68[1]
II	2	**Annual Contributions of the Governments**		177,000,00
III	3	**Interest on bank deposit** ..... estimated		4,000,00
IV	4	**Interest on Treasury Bonds**		3,040,00[2]
	5	**Profit on Bonds redeemed**		2,530,98
V	6	**Sale of publications** ..... estimated		1,000,00
		Total Receipts...		391,452,66

[1]) **Balance:—**
Kr. 49,069,02 Danish Treasury Bills.
„ 154,812,66 Cash and deposited in the Handelsbank.
Kr. 203,881,68

[2]) This sum will be increased by further investments.

Expenditure:—

Head	No.	Item	Kroner	Kroner
I		**Incidental expenses:—**		
	1	President	6,000,00	
	2	Chairman of the Editorial Committee	2,000,00	
	3	Hydrographical Consultant	3,000,00	
	4	Editor for Statistics	2,000,00	
	5	Editor of the Journal	3,000.00	
			16,000,00	16,000,00
II		**Administrative Staff:—**		
	6	Administrative Secretary	13,200,00	
	7	1st Assistant Secretary	6,000,00	
	8	2nd Assistant Secretary	4,500,00	
	9	Hydrographical Staff	13,000,00	
	10	Statistical Assistant	4,000,00	
			40,700,00	40,700,00
III		**Expenses of the office in Copenhagen:—**		
	11	Rent, service, heating, stationery, books, binding of books, light, gas, telephone, telegrams, insurance, postage, freights, typewriting and miscellaneous expenses (cataloguing of library)	15,000,00	15,000,00
IV	12	**Travelling expenses**	13,000,00	13,000,00
V	13	**Chairmen of Committees**	29,000,00	29,000,00
VI	14	**Special Resolutions** of the Council (For details see p. 19)...	35,525,40	35,525,50
VII	15	**Printing and distribution** (For details see pag. 20)	57,000,00	57,000,00
VIII	16	**Transferred to Pension Fund**	3,040,00	3,040,00
		Total Expenditures...		209,265,50

Annual Contributions of the Governments:—

Belgium	5,000,00
Great Britain	20,000,00
Denmark	10,000,00
Finland	5,000,00
France	20,000,00
Germany	20,000,00
Ireland	10,000,00
Italy	20,000,00
Netherlands	10,000,00
Norway	10,000,00
Poland	10,000,00
Portugal	5,000,00
Spain	20,000,00
Sweden	10,000,00
Latvia	2,000,00
Kr.	177,000,00

Special Reserve for Pensions.

Cash in hand at 31st March 1928	Kr. 6,758,16
Interests from Treasury Bills falling due in 1928—29	- 3,040,00
	Kr. 9,798,16

Statement of Special Resolutions.

Mrs. Drechsel's pension (Proc.-Verb. Vol. XLV p. 26)	Kr.	6 500.00
Tidal Institute (unexpended vote Proc.-Verb. Vol. XXXVIII p. 31)	-	5 472.00
Dr. Pettersson's Plankton Apparatus (unexpended vote Proc.-Verb. Vol. XLV p. 28)	-	453.40
Experiments with Fishing Gear (Current Proc.-Verb. p. 96)	-	5 000.00
Prof. Joubin's Illustrations of Atlantic Fauna (Current Proc.-Verb. p. 12)	-	3 000.00
Contribution to Prof. Gilson's work for 1927—28 and 1928—29 (See Footnote)	-	5 000.00
Hydrographical Charts (Current Proc.-Verb. p. 12)	-	900.00
Special expenses for Library (Current Proc.-Verb. p. 14)	-	800.00
Preparation of Index of Publications (Current Proc.-Verb. p. 14)	-	400.00
Expenses of Prof. Mielck's investigation of Plankton Nets (unexpended vote see Proc.-Verb. Vol. XLV p. 28)	-	3 000.00
Honorarium to Dr. Pettersson on conclusion of his service (Current Proc.-Verb. p. 12)	-	5 000.00
	Kr.	**35 525.40**

Note. Contribution to Prof. Gilson's work. The sum of Kr. 2 500.— in aid of Prof. Gilson's work was voted by correspondence for the year 1927—28, but has not yet been paid owing to delay in the payment of Belgium's Contribution for the Council's expenses. As to the contribution for 1928—29 see the current volume of Proc.-Verb. p. 12). As to terms of the arrangement see Proc.-Verb. Vol. XLI p. 28).

ESTIMATES*)

of

Publications to be printed during the financial year 1928—29.

Series	Subject	Authorisation	Estimated cost Kroner	Remark
Rapp. & Proc.-Verb.	Jubilee Volume	Pr.-Verb. Vol. XLV p. 27	9 100.00	Residue of Kr. 10 000 voted last year
—	North Eastern Area Report	Bureau	10 000.00	Part printed; 3 papers not yet received
—	Procès-Verb. 1928	Standing orders	3 000.00	Based on cost of last year
—	Baltic & Transition Area Rep.	Pr.-Verb. Vol. XLV pp. 30, 48, 66	2 700.00	
—	North Western Area Report	Pr.-Verb. current issue p. 12	5 000.00	
—	Atlantic Slope Report	Pr. Verb. Vol. XXVIII p. 30	3 000.00	Based on cost of last year
—	Report on Littoral Fishing	Pr.-Verb. current issue p. 74	4 500.00	
—	Reports of the Scientific meetings	Pr.-Verb. current issue p. 12	5 000.00	
Bulletin	Hydrographique	Standing orders	2 500.00	Based on cost of last year
—	Trimestriel 1928 No. 1	Pr.-Verb. Vol. XLV p. 68	700.00	
—	Statistique 1926	Standing orders	1 500.00	Based on cost of last year
Journal du Conseil	Vol. III, Nos. 2 & 3 - IV, No. 1	— —	9 000.00	

Total. . .	Kr. 56 000.00
paid on account. . . -	4 000.00
	Kr. 52 000.00
Other costs of publication:	
Translations, drawings etc. -	3 000.00
Distribution . . . . . -	2 000.00
	Kr. 57 000.00

*) NB. These Estimates are framed as closely as the conditions permit, but are inevitably subject to considerable variation according to the ultimate cost of production.

List of Members of Committees.

Consultative Committee.

Professor Johan Hjort, chairman,
Mr. Oscar Sund,
Professor Johs. Schmidt,
Dr. Ed. le Danois,
Professor Rafael de Buen,
Mr. David T. Jones,
Prof. G. Gilson,
Prof. W. Mielck,
Dr. A. Bowman,
Mr. J. O. Borley,
Dr. A. C. Johansen,
Dr. K. A. Andersson,
Professor Martin Knudsen,
Professor C. H. Ostenfeld,
Professor D'Arcy W. Thompson,
Professor H. Henking,
Dr. E. S. Russell.

North Eastern Area Committee.

Norway:	Professor Johan Hjort, chairman,
	Mr. Oscar Sund, vice-chairman,
	Mr. S. K. Asserson,
Denmark:	Professor Johs. Schmidt,
England:	Dr. E. S. Russell,
France:	Commandant Charcot,
	failing him Dr. Ed. le Danois,
Germany:	Mr. H. Lübbert,
Scotland:	Dr. R. S. Clark,
Sweden:	Dr. K. A. Andersson,
	Dr. G. Ekman.

North Western Area Committee.

Denmark:	Professor Johs. Schmidt, chairman,
England:	Dr. E. S. Russell,
France:	Dr. Ed. le Danois,
Germany:	Professor E. Ehrenbaum,
Norway:	Mr. Oscar Sund,
Scotland:	Dr. A. Bowman.

Atlantic Slope Committee.

France:	Dr. Ed. le Danois, chairman,
	Professor L. Joubin,
	Professor L. Roule,
Spain:	Professor Rafael de Buen, vice-chairman,
	Professor José Giral,
England:	Dr. E. J. Allen,
	Dr. E. S. Russell,
Germany:	Professor G. Schott,
Irish Free State:	Mr. G. P. Farran,
Italy:	Professor G. Magrini,
Portugal:	Dr. A. Ramalho.

Combined North Sea Committee.

Mr. David T. Jones, chairman,
Professor G. Gilson, vice-chairman.

Northern North Sea Committee.

Scotland:	Dr. A. Bowman, chairman,
Denmark:	Professor Johs. Schmidt,
England:	Mr. F. M. Davis,
France:	Mr. le Gall,
Germany:	Professor E. Ehrenbaum,
Holland:	Dr. J. J. Tesch,
Norway:	Mr. Oscar Sund,
Poland:	Mr. J. Borowik,
Sweden:	Professor O. Pettersson,
	Dr. A. R. Molander.

Southern North Sea Committee.

Germany:	Professor W. Mielck, chairman,
Belgium:	Professor G. Gilson,
Denmark:	Dr. A. C. Johansen,
England:	Mr. F. M. Davis,
France:	Dr. Ed. le Danois,
Holland:	Mr. P. M. van Riel,
	Dr. J. J. Tesch,
Norway:	Mr. Paul Bjerkan,
Scotland:	Dr. A. Bowman,
Sweden:	Dr. K. A. Andersson.

Transition Area Committee.

Denmark:	Dr. A. C. Johansen, chairman,
	Professor Martin Knudsen,

Germany:	Dr. S. Strodtmann,
	Dr. E. Fischer,
Norway:	Mr. Paul Bjerkan,
Sweden:	Professor O. Pettersson,
	Dr. K. A. Andersson.

Baltic Area Committee.

Sweden:	Dr. K. A. Andersson, chairman,
	Dr. H. Pettersson,
Denmark:	Dr. A. C. Johansen,
	Professor Martin Knudsen,
Finland:	Professor R. Witting,
	Professor T. H. Järvi,
Germany:	Professor H. Henking,
	Dr. E. Fischer,
Latvia:	Mr. V. Miezis,
Poland:	Professor M. Siedlecki,
	Mr. J. Borowik.

Hydrographical Committee.

Denmark:	Professor Martin Knudsen, chairman,
Belgium:	Professor G. Gilson,
England:	Dr. J. N. Carruthers,
	Mr. J. R. Lumby,
Finland:	Professor R. Witting,
France:	Dr. Ed. le Danois,
Germany:	Professor G. Schott,
Holland:	Mr. P. M. van Riel,
	Professor E. van Everdingen,
Irish Free State:	Mr. G. P. Farran,
Italy:	Professor G. Magrini,
Latvia:	Mr. V. Miezis,
Norway:	Mr. Oscar Sund,
Poland:	Professor M. Siedlecki,
Portugal:	Dr. A. Ramalho,
Scotland:	Professor D'Arcy W. Thompson,
Spain:	Mr. Léon Herrero,
	Professor José Giral,
	failing them Professor Rafael de Buen,
Sweden:	Professor O. Pettersson.

Plankton Committee.

Denmark:	Professor C. H. Ostenfeld, chairman,
Belgium:	Professor G. Gilson,
England:	Mr. R. E. Savage,

Germany:	Professor K. Brandt,
Holland:	Dr. J. J. Tesch,
Irish Free State:	Mr. G. P. Farran,
Latvia:	Mr. V. Miezis,
Norway:	Mr. Paul Bjerkan,
	Professor H. Gran,
Poland:	Dr. A. Litynski,
Scotland:	Dr. R. S. Clark,
Spain:	Dr. Juan Cuesta Urcelay,
Sweden:	Dr. K. A. Andersson.

Statistical Committee.

Scotland:	Professor D'Arcy W. Thompson, chairman,
	Mr. David T. Jones,
Belgium:	Professor G. Gilson,
England:	Dr. E. S. Russell,
	Mr. T. Edser,
Finland:	Professor T. H. Järvi,
France:	Mr. G. Lecourbe,
Germany:	Professor H. Henking,
Holland:	Dr. J. J. Tesch,
Irish Free State:	Mr. C. Green,
Latvia:	Mr. V. Miezis,
Norway:	Mr. S. K. Asserson,
Poland:	Mr. J. Borowik,
Spain:	Captain Sebastian Noval,
	Dr. Fernando de Buen,
Sweden:	Dr. K. A. Andersson.

Limnological Committee.

Germany:	Professor H. Henking, chairman,
	Professor E. Ehrenbaum,
Denmark:	Dr. A. C. Johansen,
England:	Dr. E. S. Russell,
Finland:	Professor T. H. Järvi,
France:	Professor L. Roule,
Irish Free State:	Mr. R. Southern,
Latvia:	Mr. V. Miezis,
Poland:	Professor M. Siedlecki,
	Dr. F. E. Lubecki,
Spain:	Dr. Fernando de Buen,
Sweden:	Dr. K. A. Andersson.

Editorial Committee.

Professor O. Pettersson, chairman,
Professor D'Arcy W. Thompson,
Professor G. Gilson,
Professor L. Joubin,
failing him Dr. Ed. le Danois,
Professor Martin Knudsen,
Professor E. Ehrenbaum,
Professor Odón de Buen,
Professor G. Magrini,
Professor M. Siedlecki,
Dr. E. S. Russell.

Finance Committee.

The President,
Professor M. Knudsen,
Mr. G. Lecourbe,
Dr. A. Ramalho,
Professor Johs. Schmidt,
Professor M. Siedlecki.

Special Committees.

Whaling Committee.

Professor Johan Hjort, chairman,
Mr. J. O. Borley,
Dr. Fernando de Buen,
Dr. Ed. le Danois,
Mr. David T. Jones,
Deputy Dr. A. Bowman,
Professor Johs. Schmidt,
Dr. A. Ramalho,
Mr. H. Lübbert.

Committee for Oceanographical Bibliography.

Professor G. Magrini,
Dr. E. S. Russell,
Professor Martin Knudsen.

Recommendations of the Consultative Committee.

Chairman: Professor Johan Hjort.
The Committee met on May 31st, June 2nd, and 6th, 1928.

1) Editing of Reports.

The Consultative Committee recommended that abstracts of communications and discussions should be published but confined in each case to a title and a summary of the communication which should not exceed twenty lines in length. A brief note of any parts of the discussion which led to a modification of the programme for future work might also be published, the note not to exceed twenty lines in length.

2) Report of the Baltic and Transition Area Committees.

The Consultative Committee accepted the proposals of the report of the Transition Area and the Baltic Area Committees in their scientific aspect and welcomed the communications of the Danish Foreign Office[1]) regarding the intended agreement, which is considered to be the beginning of the realisation of the measures mentioned. The Consultative Committee recommended the Area Committees to continue the studies of the stock of fishes, to follow the effects of the measures proposed, and to report to the Council on their work.

3) Report of Committees.

The following reports of Committees were approved by the Chairmen of the Committees concerned and were passed by the Consultative Committee:—

North Eastern Area Committee		North Western Area Committee	
Atlantic Slope	—	Combined North Sea	—
Southern North Sea	—	Northern North Sea	—
Transition Area	—	Baltic Area	—
Hydrographical	—	Plankton	—
Statistical	—	Limnological	—
Whaling	—	Sub-Committee for Savings-gear	

and the Reports of the Scientific Meetings on June 4th and 5th.

[1]) See Appendix.

Recommandations du Comité Consultatif.

Président: le Prof. JOHAN HJORT.
Le Comité se réunit les 31 Mai, 2 Juin et 6 Juin 1928.

1) Edition des Rapports.

Le Comité consultatif recommande que des extraits des communications et discussions soient publiés, mais qu'ils se limitent à un titre et à un sommaire ne dépassant pas vingt lignes. On pourrait aussi publier une note spéciale n'excédant pas vingt lignes, au sujet de toute partie d'une discussion tendant à une modification du programme de travail, dans l'avenir.

2) Rapport du Comité Baltique et du Comité du Secteur de Transition.

Le Comité consultatif accepte, sous leur aspect scientifique, les propositions du Rapport du Comité du Secteur de Transition et du Comité Baltique, et reçoit avec satisfaction les communications du Ministère des Affaires Etrangères Danois[1]), au sujet de l'accord projeté qui est considéré comme un commencement de réalisation des mesures mentionnées. Le Comité consultatif recommande que les Comités des Secteurs continuent leurs études sur le stock des poissons, afin de suivre l'effet des mesures proposées, et de faire, au Conseil, rapport sur leur travail.

3) Rapports des Comités.

Les rapports des Comités suivants sont approuvés par les Présidents des Comités intéressés et transmis par le Comité consultatif:

Comité du Secteur Nord-Est
— du Plateau Continental Atlantique
— du Sud de la Mer du Nord
— du Secteur de Transition
— Hydrographique
— Statistique
— de la Baleine

Comité du Secteur Nord-Ouest.
— combiné de la Mer du Nord
— du Nord de la Mer du Nord
— du Secteur Baltique
— du Plancton
— Limnologique
Sous-Comité des Engins épargneurs

ainsi que les Rapports des Réunions scientifiques du 4 et du 5 Juin.

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[1]) Voir l'Appendice.

The Consultative Committee agreed the following proposals which involve expenditure:—

North Western Area Committee, Recommendation.
Atlantic Slope Committee, Point 13.
Combined North Sea Committee, Recommendation III.
Hydrographical Committee, Point X.
Limnological Committee, Recommendation I.
Whaling Committee, Recommendation II.
Sub-Committee for Savings-gear, Recommendation II.
Scientific Meetings, Resolution II, including the printing of short summaries of papers by Prof. Mielck and Dr. Harold Thompson.

4) Scientific Meetings.

The Consultative Committee requested the Bureau to allot at least one day during the next Council Meeting for discussion of the printed reports of the communications received at this year's scientific meetings.

The Consultative Committee expressed its thanks to Dr. Jacobsen and to Dr. Johansen for undertaking to edit the reports of the scientific meetings on the hydrographical and the biological question respectively.

The Consultative Committee recommended as subjects for discussion at next year's general scientific meetings

a) Current measurements, direct and indirect,
b) Fluctuations in the abundance in the stock of food fishes of various species.

It was decided to request Prof. Witting to introduce the subject of current measurements, and Prof. Hjort that of fluctuations.

It was decided further that in each case the arrangements as to other speakers and the general programme of the discussion should be carried out by the gentlemen undertaking to open the discussion in each case.

5) Enlargement of the Consultative Committee.

Owing to the election of Prof. Mielck as Chairman of the Southern North Sea Committee and of Prof. Gilson as Vice-Chairman of the Combined North Sea Committee, the Council is asked to enlarge the Consultative Committee in order that Mr. Borley may be retained as a member.

Le Comité consultatif agrée les propositions suivantes qui comportent des dépenses:

Comité du Secteur Nord-Ouest, Recommandation.
Comité du Plateau Continental Atlantique, Point 13.
Comité combiné de la Mer du Nord, Recommandation III.
Comité Hydrographique, Point X.
Comité Limnologique, Recommandation I.
Comité de la Baleine, Recommandation II.
Sous-Comité des Engins épargneurs, Recommandation II.
Réunions scientifiques, Résolution II, y compris l'impression de courts résumés des travaux du Prof. Mielck et du Dr. Harold Thompson.

4) Réunions scientifiques.

Le Comité consultatif demande que le Bureau assigne au moins un jour, lors de la réunion suivante du Conseil, à la discussion des rapports imprimés des communications présentées aux réunions scientifiques de cette année.

Le Comité consultatif exprime ses remerciements au Dr. Jacobsen et au Dr. Johansen qui se sont chargés de publier, respectivement, les rapports sur les questions hydrographiques et biologiques traitées dans les réunions scientifiques.

Le Comité consultatif recommande comme sujets de discussion pour les réunions scientifiques générales de l'année prochaine:

a) La mesure des courants, directe et indirecte,
b) Les fluctuations d'abondance du stock des poissons alimentaires, de diverses espèces.

Il est décidé de demander au Prof. Witting d'introduire le sujet des mesures de courant et au Prof. Hjort d'introduire celui des fluctuations.

Il est décidé aussi que dans les deux cas les dispositions concernant les autres participants et le programme général seront prises par les membres chargés d'ouvrir la discussion.

5) Extension du Comité Consultatif.

A la suite de l'élection du Prof. Mielck comme Président du Comité du Sud de la Mer du Nord et du Prof. Gilson comme Vice-Président du Comité combiné de la Mer du Nord, il est demandé au Conseil d'augmenter le Comité Consultatif, afin que Mr. Borley puisse y être maintenu comme membre.

APPENDIX

Translated from Danish.

FOREIGN OFFICE
Copenhagen, December 14th, 1927.
2 Enclosures.

Sir,

With reference to previous communications from the Foreign Office to Captain Drechsel relating to the Danish-German negotiations for the adoption of common measures of closure for plaice in the western part of the Baltic, the last communication being dated November 18th 1926, the Foreign Office informs you herewith that the joint Danish-German Delegation has prepared a proposal, a copy of which is herewith enclosed, together with a covering letter, which have been submitted in facsimile to the Danish and German Governments respectively.

The Ministry for Agriculture, in forwarding to the Foreign Office the copy drawn up for the Danish Government, has declared that it can give its assent to the proposal in question with the exception of the provision in Section 6, Paragraph 2, which must be omitted as being contrary to the principles of Criminal Law which are ordinarily complied with in similar circumstances, and it has requested the Foreign Office to submit the proposal, before further steps be taken, to the International Council for the Exploration of the Sea for inspection and comment.

In accordance herewith, the Foreign Office requests you to take the further necessary steps in compliance with the request of the Ministry for Agriculture and to communicate duly to the Foreign Office any comments the Council may wish to make on the matter as soon as is conveniently possible.

I am, Sir,
your obedient servant
(signed) Engell.

Captain K. Schøning,
Administrative Secretary to the International
Council for the Exploration of the Sea.

Translated from Danish.

THE DANISH-GERMAN DELEGATION
for discussing the adoption of common measures
of closure for plaice in the western Baltic.

November 1927.

To the Ministry for Agriculture.

The Chairmen of the Danish-German Delegation for discussing the adoption of common measures of closure for plaice in the western Baltic beg to present to their respective Governments on behalf of this Delegation a draft, accepted by both parties after negotiation, for an agreement between Denmark and Germany relating to the regulation

APPENDICE

Traduit du Danois.

MINISTÈRE DES AFFAIRES ÉTRANGÈRES
Copenhague le 14 Déc. 1927.
2 pièces.

Monsieur,

En référant à d'autres écrits d'ici au Commandant Drechsel concernant les pourparlers danois-allemands pour l'établissement de dispositions communes concernant la conservation de la plie dans le secteur occidental de la mer Baltique, le dernier écrit datant du 18 nov. passé, le Ministère des Affaires Etrangères vous communique que le Comité danois-allemand a rédigé le projet dont la copie est ci-jointe avec pièce ajoutée et l'a présenté en deux exemplaires pareils qui ont été remis respectivement au Gouvernement danois et au Gouvernement allemand.

En envoyant l'exemplaire au Gouvernement danois, le Ministère de l'Agriculture a déclaré que pour sa part il pouvait accéder à la convention à l'exception de l'article 6, de la 2ème pièce, qui doit être évité comme contraire aux principes pénaux observés d'habitude en pareil cas, mais en même temps le Ministère en question s'en remet au Ministère des Affaires Etrangères pour qu'avant de rien entreprendre le projet soit présenté au Conseil International de l'Exploration de la Mer afin d'être examiné et soumis à des remarques éventuelles.

Le Ministère des Affaires Etrangères prie donc Monsieur le Commandant d'entreprendre le nécessaire pour répondre à la demande du Ministère de l'Agriculture et de communiquer aussi vite que possible au Ministère des Affaires Etrangères les observations du Conseil relatives à cette affaire.

Je suis, Monsieur, votre obéissant serviteur,

(signé) Engell.

Monsieur le Commandant K. Schøning,
Secrétaire administratif du Conseil International
pour l'Exploration de la Mer.

Traduit du Danois.

COMITÉ DANOIS-ALLEMAND
pour la délibération de l'établissement de mesures communes pour la conservation de la plie dans le secteur occidental de la Baltique.

Novembre 1927.

Au Ministère de l'Agriculture.

Les Présidents du Comité danois-allemand pour la délibération de l'établissement de mesures communes pour la conservation de la plie dans la partie occidentale de la Baltique se permettent au nom du Comité de présenter à leur Gouvernement respectif un projet, accepté après délibérations, d'une convention entre le Danemark et l'Allemagne regardant l'organisation de la pêche dans la partie occidentale de la Baltique en priant

of fishing in the western Baltic, with the request that this agreement between Denmark and Germany may be concluded as soon as is conveniently possible.

With reference to the separate sections of the draft, the following should be noted:—

Section 1. It is assumed that all bays, fjords, and creeks, which lie within or are contiguous to this specified area, are comprised in the provisions of this agreement.

Flensborg Fjord is separately mentioned because, as regards this area, a special agreement is already in existence, which fixes the minimum length of plaice at 22 cm.

Section 2. It is assumed that plaice below the minimum length from other localities, e. g. from the Cattegat or the North Sea, may not be taken by ship and landed in any harbour or on the coasts within the area specified in Section 1.

Section 3 and 4. This section must in our opinion be drawn up as proposed, seeing that a supervision of the fishery for the purpose of upholding more extensive regulations does not appear to be feasible at the present time owing to the lack of sufficient supervision outside territorial waters.

Section 6. In consideration of the provisions of the Law in force in both countries, it has only been considered necessary to propose the adoption of a minimum fine.

Section 7. With a view to the maintenance of the plaice fishery in the western Baltic, it is requested that the negotiations for the conclusion of this agreement may be pressed forward in order that the provisions of the agreement may come into force in both countries on January 1st 1928.

The Delegation is of the opinion that it is very desirable that in conjunction with this agreement a close time for plaice in the southern part of the eastern Baltic should be instituted for the purpose of maintaining the plaice fishery there. It suggests therefore that an extension of the provisions of this agreement, which deal with the close time for plaice, so as to cover this area also should receive consideration, and that with this object in view the necessary negotiations may be set on foot as soon as possible with the countries in question.

(signed) F. V. Mortensen. Dr. Eichelbaum.

Translated from Danish.

THE DANISH-GERMAN DELEGATION
for discussing the adoption of common measures
of closure for plaice in the western Baltic.

Draft for an Agreement between Denmark and Germany for the Regulation of the Plaice Fishery in the western Baltic.

Section 1. The provisions in this agreement refer to that part of the western Baltic, including Flensborg Fjord (cf. Agreement between Denmark and Germany relating to the joint fishery in Flensborg Fjord of April 10th 1922), which is bounded on the south and west by the German coast, on the north by the Danish coast and the following lines:—

le Gouvernement de bien vouloir faire reconnaitre cette convention entre le Danemark et l'Allemagne aussi vite que possible.

Les remarques suivantes concernant quelques articles du projet sont à noter:

Article No. 1. Il va de soi qui tous les golfes, fjords et baies situés sur ce secteur ou à sa limite sont compris dans les décisions de la convention.

Le fjord de Flensbourg a été spécialement nommé parce qu'on a fait une convention particulière pour ce district où la longueur minimale de la plie est fixée à 22 cm.

Article No. 2. Il va de soi que des plies au-dessous de la taille requise ne doivent pas être apportées par bateau d'autres mers, par exemple du Cattégat ou de la Mer du Nord, dans des ports ou aux côtes du secteur compris dans l'article 1.

Article No. 3 et 4. Ces articles doivent, selon notre opinion, être conçus de la manière proposée, car il est impossible pour le moment d'exercer une surveillance de la pêche pour le maintien de plus amples dispositions, le contrôle de la pêche n'étant pas suffisant en dehors de ce secteur maritime.

Article No. 6. En prenant égard aux décisions légales en vigueur dans les deux pays, on a considéré nécessaire de fixer le minimum de l'amende.

Article No. 7. Dans l'intérêt du maintien de la pêche de la plie dans la partie occidentale de la Baltique, on prie de hâter autant que possible les pourparlers pour la conclusion de cette convention, afin que les décisions de la convention puissent entrer en vigueur dans les deux pays le 1er janvier 1928.

Le Comité est d'avis qu'il serait très désirable qu'à la suite de ce traité, on fixe aussi une période de clôture pour la pêche de la plie dans la partie sud de la Baltique orientale, afin d'y conserver la pêche de la plie. On prie donc de bien vouloir prendre en considération, que les décisions de cette convention en ce qui concerne un temps prohibé pour la pêche de la plie, doivent s'étendre aussi à ce secteur et, qu'ainsi, il est nécessaire de se mettre aussi vite que possible en rapport avec les pays compétents pour commencer les pourparlers à ce sujet.

(signé) F. V. Mortensen. Dr. Eichelbaum.

Traduit du Danois.

COMITÉ DANOIS-ALLEMAND
pour la délibération de l'établissement de mesures communes pour la conservation de la plie dans le secteur occidental de la Baltique.

Projet de convention entre le Danemark et l'Allemagne pour l'organisation de la pêche de la plie dans la Baltique occidentale.

Article No. 1. Les décisions de cette convention comptent pour le secteur occidental de la mer Baltique, y compris le fjord de Flensbourg (comp. Traité du 10 avril 1922 entre le Danemark et l'Allemagne pour la pêche en commun dans le fjord de Flensbourg) secteur limité au sud et à l'ouest par la côte allemande et au nord par la côte danoise et les lignes suivantes:

a) The pontoon-bridge at Sønderborg,
b) Pøls Huk — Skjoldnæs,
c) Ærøhale — Ristingehale,
d) Gulstav — Kappel church,
e) Flinthorne Odde — Skelby church,
and on the east by the line Gedser — Ahrenshoop.

Section 2. Within the area specified in Section 1 a common minimum of 24 cm. total length shall be fixed for plaice (*Pleuronectes platessa*). Plaice measuring in length less than this amount shall not be brought to or landed at any port or coast within the area specified.

Section 3. Within the area specified in Section 1, an annual close time for plaice shall be instituted from February 15th to March 31st inclusive, during which period it shall be forbidden to bring to or land at any harbour or coast within the specified area plaice of any size whatever.

Section 4. The fishermen of the two contracting countries shall be enjoined by suitable regulations to liberate captured plaice below the minimum length, and during the close time all captured plaice, immediately after capture, due care being taken to avoid any injury to the fish.

Section 5. The Governments of the two countries bind themselves to adopt the necessary measures for the carrying into effect of this agreement and to inform each other of these measures.

Section 6. Infringements of the regulations in Sections 2 and 3 shall be punished in each of the two countries according to their respective laws, whereby, however, in Denmark a fine of not less than Kr. 20.00 shall be imposed, and in Germany a fine of not less than Mk. 20.00.

In cases of infringement, the prosecution of the fisherman may be handed over to the authorities of his native country.

Section 7. This agreement can be terminated by either of the contracting countries by giving notice to this effect 6 months before the close of any calendar year.

a) Pont de bateaux de Sønderborg,
b) Pøls Huk — Skjoldnaes,
c) Aerøhale — Ristingehale,
d) Gulstav — Eglise de Kappel,
e) Flinthorne Odde — Eglise de Skelby,
ainsi qu'à l'est par la ligne Gedser—Ahrenshoop.

Article No. 2. Dans le secteur nommé dans l'article 1, on fixe une longueur commune minimale de 24 cm, longueur totale, pour la plie (*Pleuronectes platessa*). Les plies au-dessous de cette taille ne doivent pas être amenées dans les ports ou aux côtes du secteur nommé et non plus y être apportées à terre.

Article No. 3. Dans le secteur nommé à l'article 1, il est fixé un temps prohibé pour la pêche de la plie du 15 février ou 31 mars, les deux jours compris. Pendant cette période de temps, il est défendu d'apporter des plies de n'importe quelle grandeur dans aucun port ou à une côte du secteur désigné.

Article No. 4. Les pêcheurs des deux pays contractants sont obligés, par des mesures convenables, à rejeter immédiatement à la mer et en prenant les précautions nécessaires pour la conservation de leur existence, les plies au-dessous de la taille requise ou pêchées en temps prohibé.

Article No. 5. Les Gouvernements des deux pays s'obligent à prendre les mesures nécessaires pour l'observation de cette convention, et à se donner mutuellement communication de ces dispositions.

Article No. 6. Les infractions aux décisions des articles 2 et 3 sont punies dans les deux pays selon les lois en vigueur, mais en tout cas de telle manière qu'en Danemark l'amende minimale est de 20 couronnes et en Allemagne elle est de 20 Marks.

En cas de contravention, la patrie du pêcheur peut être chargée de la peine.

Article No. 7. Cette convention peut être dénoncée par chacun des deux pays à 6 mois d'avis pour la fin de l'année du calendrier.

Programmes and Reports of Area Committees.

North Eastern Area Committee.

Chairman: Prof. HJORT.
Vice-Chairman: Mr. OSCAR SUND.
The Committee met at 11,30 a. m. on June 1st, 1928.

The Committee took note of the following communications:—

1) The Vice-Chairman, Mr. OSCAR SUND, made a short statement regarding the work carried out during the past year and explained the methods employed and the results obtained in the cod investigations.
2) Mr. EINAR LEA gave a short abstract from recent work on the herring and mentioned the finds recently made at sea of herring eggs of which a high percentage was found to be dead. On behalf of Mr. BJERKAN he referred to his colleagues work on the sprat.
3) The Chairman, Prof. HJORT, emphazised the importance of carrying out drift net experiments in the waters to the north of the North Sea.

The discussion resulted in the following recommendations:—

I) The Committee agreed that the work done in 1927 by the several countries was on useful lines and recommended their continuance in the measure possible.
II) In addition the Committee agreed to the desirability of measurements being made at the British and German ports of fish (cod, haddock, plaice) caught in the North Eastern Area, especially in the Barents Sea, as a completion of and corollary to the Norwegian work on the stocks of these fish, the details to be settled by correspondence.

The Chairman and Vice-Chairman were re-elected for the ensuing year.

North Western Area Committee.

Chairman: Prof. Dr. JOHS. SCHMIDT.
The Committee met at 2,30 p. m. on June 2nd, 1928.

The Chairman welcomed Dr. HAROLD THOMPSON and Dr. SPÄRCK as guests.

During consideration of the Administrative Report, the Chairman drew special attention to certain features of the work done, notably the catches of plaice inside and outside the limits; and graphs were shown indicating the main results of these investigations. Furthermore, graphs were shown illustrating the results of marking experi-

Programmes et Rapports des Comités des Secteurs.

Comité du Secteur Nord-Est.

Président: le Prof. Hjort.
Vice-président: Mr. Oscar Sund.
Le Comité se réunit à 11.30 a. m., le 1 Juin 1928.

Le Comité prend note des communications suivantes:

1) Le Vice-Président, Mr. Oscar Sund, fait un court rapport sur le travail accompli pendant l'année précédente et expose la méthode adoptée et les résultats obtenus par les recherches sur le cabillaud.
2) Mr. Einar Lea présente un court aperçu sur le travail récemment exécuté sur le hareng et fait mention des trouvailles récemment faites sur les lieux de ponte de frai de hareng dont une grande proportion se montrait de consister en oeufs morts. Au nom de M. Bjerkan M. Lea fait mention des investigations de son collègue sur l'esprot.
3) Le Président, le Prof. Hjort, insiste sur l'importance de la continuation d'expériences au filet dérivant dans les eaux situées au Nord de la Mer du Nord.

La discussion aboutit aux recommandations suivantes:

I) Le Comité est d'avis que le travail accompli en 1927 par les divers Pays, a été conduit dans des voies utiles et recommande sa continuation dans la mesure du possible.
II) En outre le Comité est d'avis qu'il est désirable qu'il soit fait dans les ports Britanniques et Allemands, des mensurations de poissons (cabillaud, églefin, plie) capturés dans le Secteur Nord-Est, et spécialement dans la Mer de Barents, comme achèvement et corollaire du travail Norvégien sur les stocks de ces poissons, — les détails devront être décidés par correspondance.

Le Président et le Vice-président sont réélus pour l'année prochaine.

Comité du Secteur Nord-Ouest.

Président: le Prof. Dr. Johs. Schmidt.
Le Comité se réunit à 2.30 p. m., le 2 Juin 1928.

Le Président souhaite la bienvenue au Dr. Harold Thompson et au Dr. Spärck, en qualité d'hôtes.

Au cours de l'examen du rapport administratif, le Président attire spécialement l'attention sur certains traits du travail accompli et notamment sur les captures faites en dedans et en dehors des limites; des graphiques exposant les principaux résultats de ces investigations sont exposés. En outre des graphiques exposent les résultats des ex-

ments of cod in Greenland waters, and attention was drawn to the fact that investigations on the number of vertebrae have shown no connection between the Greenland cod and the American cod.

The Committee received the following communications:—

1) Dr. Harold Thompson. On the growth of the haddock in Icelandic waters. This report was based on material obtained from the cruise of the "Explorer" in 1925; graphs were shown illustrating the results.
2) Mr. Bruun. On the growth of the cod at the Faroes and Iceland. He commented also on the plaice investigations of Mr. Tåning in Icelandic waters.
3) Dr. Spärck. On the work done round the Faroes and in Icelandic waters regarding the benthos.

Programme of further investigations: 1) The "Dana" will not be sent to Iceland this summer, but arrangements will be made to continue the collections of material and to conduct some special investigations. A Danish expedition in the surveying ship "Godthaab", under the leadership of Captain Riis-Carstensen has left to pursue investigations in the waters west of Greenland during the whole summer. 2) The Norwegian research ship "Armauer Hansen" will undertake hydrographical investigations in the Faroe-Shetland Channel. 3) Scottish investigators intend to carry fishery investigations at the Faroes and Faroe Bank and hydrographic investigations in the Faroe-Shetland Channel, between Faroe Bank and Butt of Lewis and possibly round Rockall. 4) English workers will make measurements and collections of otoliths and scales on the markets as requested.

Recommendation.

The publication of the following reports is recommended:—

Dr. R. Spärck: Preliminary survey of the results of the quantitative bottom investigations off Iceland and the Faroes in 1926—1927.

Dr. Harold Thompson: General features in the Biology of the Haddock (*Gadus aeglefinus* L.) in the Icelandic Waters in the Period 1903—1926.

Arni Fridriksson: Age-composition of the Stock of Cod in East-Icelandic Fjords during the years 1925—1927.

Å. V. Tåning: Plaice investigations in Icelandic Waters.

Professor Schmidt was re-elected as Chairman for the ensuing year.

périences de marquage du cabillaud dans les eaux du Groenland et l'attention est attirée cur le fait que des investigations sur le nombre de vertèbres ont montré qu'il n'y a aucune sonnection entre le cabillaud du Groenland et le cabillaud Américain.

Le Comité reçoit les communications suivantes:

1) Dr. Harold Thompson. Sur la croissance de l'églefin dans les eaux Islandaises. Ce rapport est basé sur un matériel obtenu de la croisière de "l'Explorer" en 1925; des graphiques exposant ces résultats sont exhibés.
2) Mr. Bruun. Sur la croissance du cabillaud aux Faroes et en Islande. Il commente aussi les investigations de Mr. Tåning, sur la plie dans les eaux Islandaises.
3) Dr. Spärck. Sur le travail exécuté autour des Faroes et dans les eaux Islandaises, sur le benthos.

Programme d'investigations ultérieures: 1) Le "Dana" ne sera pas envoyé en Islande cet été, mais des dispositions seront prises pour poursuivre les réunions de matériel et pour conduire certaines investigations spéciales. Une expédition Danoise sur le navire d'inspection "Godthaab", sous la conduite du Commandant Riis-Carstensen, est partie pour poursuivre des investigations dans les eaux de l'Ouest du Groenland pendant tout l'été. — 2) Le navire de recherches Norvégien "Armauer Hansen" entreprendra des investigations hydrographiques dans le Canal Faroe-Shetland. — 3) Des investigateurs Ecossais se proposent de poursuivre des recherches de pêcherie aux Faroes et au Banc de Faroe, et des recherches hydrographiques dans le Canal Faroe-Shetland, entre le Banc de Faroe et le Butt of Lewis, et, peut-être autour de Rockall. — 4) Les travailleurs Anglais feront, ainsi qu'il a été demandé, des mensurations et des collections d'otolithes et d'écailles, sur les marchés.

Recommandation.

La publication des rapports suivants est recommandée:

Dr. R. Spärck: Résumé préliminaire sur les résultats des investigations quantitatives du fond autour de l'Islande et des Faroes en 1926—1927.

Dr. Harold Thompson: Les traits caractéristiques généraux de la biologie de l'églefin *(Gadus aeglefinus* L.) dans les eaux d'Islande pendant la période 1903—1926.

Arni Fridriksson: Composition de l'âge du stock du cabillaud dans les fiords de l'Islande orientale pendant les années 1925—1927.

Å. V. Tåning: Investigations sur la plie dans les eaux d'Islande.

Le Prof. Schmidt est réélu Président pour l'année prochaine.

Atlantic Slope Committee.

Chairman: Dr. Ed. le Danois.
Vice-Chairman: Prof. Rafael de Buen.
The Committee met at 10,30 a. m. on June 2nd, 1928.

The programme for 1927 remains in force with the following modifications:—

1) No observations.
2) No observations.
3) No observations.
4) No observations.
5) No observations.
6) No observations.
7) a) The studies on the red tunny and the long-finned tunny will be continued in their present form.
   b) The studies of the sardine will especially bear on the differentiation of local races, and the time and place of spawning, based not only on the sex of the fishes, but also on the plankton collections of eggs and larvae.
   c) The studies on the hake will be continued in their present form; moreover a cruise of "George Bligh" in August, and a cruise of "Tanche" in July will be arranged for the year 1928. The cruise of "George Bligh" will allow of observations on the size of the meshes in the trawls. Measurements of young hake will be undertaken at the Fleetwood and Milford markets.
8) No observations.
9) No observations.
10) Plankton studies will be undertaken during various cruises in order to collect information on the plankton which forms the food of whales.
11) A service of rapid information will be organised among the members of the Committee after each cruise. Provisional lists of temperatures and final lists of salinities will be despatched by each member of the Committee to his colleagues as soon as he has received the communications in question.
12) Prof. Odón de Buen will be requested to furnish a plan for the organisation of a service of regular observations from the coastal laboratories. This plan will be communicated to the members of the Committee who will give the Chairman their opinions on this subject before the next meeting of the Committee.
13) The Atlantic Slope Committee expresses the wish that a faunistic atlas similar to that published by the International Commission for the Mediterranean, should be published by the International Council, to include all species of animals of the Atlantic Area, and especially the fishes. The publication of this atlas should take place in Paris under the direction of Professor Joubin.
14) The start of the periodical cruises of the Spanish, French, Irish and Portuguese vessels will be announced by telegram to the various members of the Committee in order to ensure an exact coincidence of these cruises.

Messrs. Ed. le Danois and Rafael de Buen were re-elected as Chairman and Vice-Chairman to the Committee.

Comité du Plateau Continental Atlantique.

Président: le Dr. Ed. le Danois.
Vice-président: le Prof. Rafael de Buen
Le Comité se réunit à 10.30 a. m., le 2 Juin 1928.

Le programme de 1927 reste en vigueur avec les modifications suivantes:—

1) Sans observations.
2) Sans observations.
3) Sans observations.
4) Sans observations.
5) Sans observations.
6) Sans observations.
7) a) Les études sur le thon rouge, et le germon seront continuées sous leur forme actuelle.
   b) Les études sur la sardine porteront principalement sur la différenciation des races locales et les dates et lieux de ponte, en se basant non seulement sur l'état sexuel des poissons, mais aussi sur les récoltes planctoniques d'oeufs et de larves.
   c) Les études sur le merlu seront continuées sous leur forme actuelle; de plus pour l'année 1928 il est prévu: une croisière du navire "George Bligh" au mois d'Août et une croisière du navire "Tanche" au mois de Juillet. La croisière du "George Bligh" permettra des observations sur la dimension des mailles des chaluts. Des mesures de jeunes merlus seront effectuées sur les marchés de Fleetwood et de Milford.
8) Sans observations.
9) Sans observations.
10) Des études planctoniques seront effectuées au cours des diverses sorties en vue de recueillir des renseignements sur le plancton servant de nourriture aux cétacés.
11) Il sera organisé un service d'informations rapides entre les membres du Comité après chaque sortie des navires. Des listes provisoires avec les températures, et définitives avec les salinités seront adressées par chaque membre du Comité à ses collègues aussitôt que les renseignements en question seront en sa possession.
12) Le Prof. Odón de Buen est prié de bien vouloir fournir un plan d'organisation d'un service d'observations regulières faites à partir des laboratoires côtiers. Ce mémoire sera communiqué aux membres du Comité qui devront faire parvenir au Président leurs observations à ce sujet avant la prochaine réunion du Comité.
13) Le Comité du Plateau Continental émet le voeu que des fiches faunistiques, analogues à celles publiées par la Commission Internationale de la Méditerranée, soient éditées par le Conseil International, comprenant les espèces animales du Secteur Atlantique, et principalement les poissons. La publication de ces fiches sera faite à Paris, sous la direction de M. le Professeur Joubin.
14) Les sorties périodiques des navires espagnols, français, irlandais et portugais seront annoncées aux différents membres du Comité télégraphiquement en vue de permettre une coïncidence exacte de ces sorties.

MM. Ed. le Danois et Rafael de Buen sont réélus comme Président et Vice-président du Comité.

Combined North Sea Committee.

Chairman: Mr. David T. Jones.
Vice-Chairman: Prof. W. Mielck.
The Committee met at 9,30 a. m. on June 6th, 1928.

The Chairman in opening the meeting expressed high appreciation of the work of Mr. Borley during the time he had been Chairman of the Southern North Sea Committee.

The following communications were received:—

1) Dr. H. Thompson: Haddock biology: a survey of recent data and their treatment.
2) Dr. Bückmann circulated a report on experiments with savings trawl.

The Committee recommended the publication of abstracts of Dr. Thompson's paper and of that of Prof. Mielck on the distribution of herring larvae, with the papers delivered at the general scientific meetings.

In regard to subjects for consideration at the next general scientific meeting the Committee proposed the discussion of fluctuations in the abundance of the various commercial species of fish, particularly in reference to the relation of these fluctuations to each other and to other phenomena.

The following resolutions were agreed to:—

I) The continuance of experiments with savings gear.

II) That in view of Prof. Mielck's election as Chairman of the Southern North Sea Committee to succeed Mr. Borley the appointment of Prof. Gilson as Vice-Chairman of the Combined North Sea Committee be recommended.

III) That Prof. Gilson in conjunction with his duties as Vice-Chairman should undertake an investigation on the distribution and frequency of the 0- and I-groups of plaice found near the Belgian coast; the same methods to be adopted as those followed by Danish, German and Dutch investigators.

Mr. David T. Jones was re-elected as Chairman for the ensuing year.

Northern North Sea Committee.

Chairman: Dr. A. Bowman.
The Committee met at 9,30 a. m. on June 2nd, 1928.

The Administrative Report was approved.

It was agreed to defer discussion of the methods of haddock investigation as outlined in Dr. Thompson's memorandum till the meeting of the Combined North Sea Committee. The questions of the distribution and of the methods of capture of the larger unscaled stages of herring were discussed and the following resolutions were adopted:—

Comité combiné de la Mer du Nord.

Président: Mr. David T. Jones.
Vice-président: le Prof. W. Mielck.
Le Comité se réunit à 9.30 a. m., le 6 Juin 1928.

Le Président, en ouvrant la séance, exprime sa haute appréciation du travail accompli par Mr. Borley au cours de sa présidence du Comité du Sud de la Mer du Nord.

Les communications suivantes sont reçues:

1) Dr. H. Thompson: Biologie de l'églefin: révision et utilisation des données récemment acquises.
2) Dr. Bückmann: distribue un rapport sur les expériences faites avec un chalut épargneur.

Le Comité recommande la publication d'extraits du travail du Dr. Thompson et de celui du Prof. Mielck sur la distribution des larves du hareng, avec les travaux présentés aux réunions scientifiques générales.

En fait de sujets à prendre en considération lors de la prochaine réunion scientifique générale, le Comité propose la discussion des fluctuations d'abondance des diverses espèces commerciales de poisson, particulièrement au point de vue des relations de ces fluctuations entre elles et avec d'autres phénomènes.

Les résolutions suivantes sont agréées:

I) La continuation des expériences avec des engins épargneurs.
II) Qu'en considération de l'élection du Prof. Mielck comme Président du Comité du Sud de la Mer du Nord pour succéder à Mr. Borley, la nomination du Prof. Gilson comme Vice-président du Comité combiné de la Mer du Nord soit recommandée.
III) Que le Prof. Gilson, en sa qualité de Vice-président, entreprenne une investigation sur la distribution et la fréquence des groupes 0 et I de la plie au voisinage de la côte de Belgique, en adoptant les mêmes méthodes que les investigateurs Danois, Allemands et Hollandais.

Mr. David T. Jones est réélu Président pour l'année prochaine.

Comité du Nord de la Mer du Nord.

Président: le Dr. A. Bowman.
Le Comité se réunit à 9.30 a. m., le 2 Juin 1928.

Le Rapport administratif est approuvé.

Il est décidé de différer la discussion des méthodes d'investigation sur l'églefin, esquissées dans le mémorandum de Mr. Thompson, jusqu'à la réunion du Comité combiné de la Mer du Nord. Les questions de la distribution et des méthodes de capture des stades de grande taille mais non écaillés du hareng sont discutées et les résolutions suivantes sont adoptées:

I) That the various countries engaged in the study of the distribution of herring larvae should endeavour to adopt similar methods of capture in order that results may be directly comparable. The Committee recommends that for vertical hauls the HENSEN or NANSEN net should be used for the capture of the smaller sizes and that the large stramin ring-trawl should be adopted for the larger sizes.

II) That standard methods should be used as far as possible for horizontal hauls namely the PETERSEN young fish trawl or large stramin ring net for the smaller forms while a small model of the three otter board net used in herring trawling should be employed for the capture of the larger unscaled forms.

The Chairman was re-elected for the ensuing year.

Southern North Sea Committee.

Chairman: Mr. J. O. BORLEY.
The Committee met at 9,30 a. m. on June 4th, 1928.

The following communications were made:—

1) Prof. MIELCK. Distribution of post-larval herring in the North Sea. A summary of this communication is appended (Appendix No. 1).
2) Dr. BÜCKMANN. Fluctuations in the stock of plaice and sole in the German Bight. A summary of this report is appended (Appendix No. 2).
3) Mr. VAN RIEL. On the Isohalines of the Southern North Sea. Mr. VAN RIEL had carried out this work at the request of his fellow members of the Hydrographical Sub-Committee for the determination of salinity normals for the North Sea. The material used consisted of records of observations made from the Dutch Light-Vessels North Hinder, Schouwenbank and Terschellingerbank, and from commercial vessels on routes between the Dutch and English coasts. By utilising also mean salinities for certain English Light-Vessels, furnished by the Lowestoft Laboratory, normal yearly isohalines were determined. Means for decades and months showed a maximum in autumn and winter in the southern and eastern parts of the area, and a transition area in the north, bordering the southward flow from along the north eastern English coast. Annual variations were computed, and were found to point to changes in the relative contributions to the total water masses of the Southern North Sea of the characteristic water of the area and of this southward flow along the British coast.
4) Prof. GILSON gave a resumé of his memoir entitled "La Pêche littorale sur les côtes de Belgique", which would appear shortly, being the first part of his whole work on the subject.

The Committee decided to continue the present programme of work without change.

Mr. BORLEY resigned his membership of the Committee. He expressed his regrets at being compelled to this step by the claims of other work, and his appre-

I) Que les divers Pays engagés dans l'étude de la distribution des larves de hareng s'efforcent d'adopter des méthodes de capture similaires, afin que les résultats puissent être directement comparables. Le Comité recommande qu'en pêche verticale, on emploie les filets de HENSEN ou de NANSEN pour la capture des petites tailles, et le grand filet annulaire en stramine pour les tailles plus grandes.

II) Que des méthodes standardisées autant que possible soient employées pour les pêches horizontales, c'est-à-dire que le chalut à jeunes poissons de PETERSEN ou le grand filet annulaire en stramine soit employé pour les petites formes, et qu'on adopte plutôt, pour les formes non écaillées plus grandes, un petit modèle du chalut à trois panneaux en usage dans le chalutage du hareng.

Le Président est réélu pour l'année prochaine.

Comité du Sud de la Mer du Nord.

Président: Mr. J. O. BORLEY.
Le Comité se réunit à 9.30 a. m., le 4 Juin 1928.

Les communications suivantes sont faites:

1) Le Prof. MIELCK. Distribution du hareng post-larvaire dans la Mer du Nord. Un sommaire de cette communication est annexé. (Appendice No. 1).
2) Le Dr. BÜCKMANN. Fluctuations du stock de plies et de soles dans la Baie Allemande. Un sommaire de ce rapport est en annexe. (Appendice No. 2).
3) Mr. VAN RIEL. Sur les Isohalines du Sud de la Mer du Nord. Mr. VAN RIEL a exécuté ce travail à la demande de ses collègues du Sous-Comité hydrographique, pour la détermination des normales de salinité pour la Mer du Nord. Le matériel employé consiste en tables d'observations faites à bord des bateaux-phare Hollandais North Hinder, Schouwenbank et Terschellingerbank, et à bord de navires de commerce sur des lignes reliant les côtes Hollandaises et Anglaises. Des isohalines normales annuelles ont été déterminées en utilisant aussi les salinités moyennes de certains bateaux-phare Anglais fournies par le Jaboratoire de Lowestoft. Les moyennes décadaires et mensuelles montrent un maximum en automne et en hiver dans les parties Sud et Est de l'aire, avec une aire de transition dans le Nord au contact de la masse d'eau qui se déplace vers le Sud le long de la côte Est d'Angleterre. La computation des moyennes annuelles indique des variations dans les contributions relatives apportées à la masse totale de l'eau du Sud de la Mer du Nord, d'une part par l'eau caractéristique de l'aire, et, de l'autre, par cette masse d'eau qui descend vers le Sud en longeant la côte anglaise.
4) Le Prof. GILSON donne un résumé de son mémoire intitulé "La Pêche littorale sur les côtes de Belgique", qui paraîtra prochainement et qui est la première partie de son travail complet.

Le Comité décide de continuer sans changement le programme actuel de travail.

Mr. BORLEY donne sa démission de membre du Comité. Il regrette d'être contraint à cette mesure par les exigences d'autres travaux et exprime son appréciation

ciation of the co-operation which had been so marked a feature of the work of the Committee during his chairmanship.

On the motion of Dr. Bowman, Prof. Mielck was elected Chairman for the ensuing year.

APPENDIX No. 1

Distribution of Herring Larvae in the North Sea during the winter months (Nov.—April).

Prof. Mielck, Heligoland.

In order to obtain a view of the general conditions for the distribution and density of herring larvae in the North Sea the data for the months November to April published in German and Dutch lists and numerous data from recent German researches have been compiled. The situation of the spawning places (as shown by the presence of newly hatched larvae), the distribution and the trend of the shoals of larvae in their various stages of development and their quantity in the various regions were shown on monthly charts.

In November, young and older larvae are numerous off the east coast of England as far as about the mouth of the Humber, while yet being absent off the coast of Holland and in the south-eastern corner of the North Sea. In December, very great quantities of newly hatched larvae are present between the coast of Holland-Belgium and England, the greatest quantities and the youngest stages being found on the Flamish Banks. Further aggregations of young larvae are observed in the south-eastern North Sea on the "Oyster grounds" (Jan., Febr.) and in the region of the Jutland Bank (Jan.). Larvae with yolk-sac are found in great quantities in the Kattegat (Febr.-April), off the coast of Norway (Febr.-March) and to the north of the Viking Bank (April). No such masses of larvae as found in the south-western North Sea (Hoofden) have ever before been observed in any other region during the winter. The general distribution takes place in the southern North Sea, south of the Dogger Bank in an easterly direction and east of the Dogger Bank in a northerly direction. The larvae seem to follow the sea-currents. The central parts of the North Sea are almost without larvae from January to April, and also in the western part only very few larvae are found later than February. In growing up they gradually approach the coasts. Those in the oldest stages, shortly before the scales are developed, frequent in great numbers the mouths of the rivers.

APPENDIX No. 2

Fluctuations in the Stock of Plaice and Sole in the German Bight.

Dr. Bückmann, Heligoland.

The effect of fluctuations in the production of plaice-fry is shown in the percentage age-composition of the stock of plaice near Heligoland from 1913—1927 and on sections

de la coopération qui a été un caractère si marqué du travail du Comité au cours de sa présidence.

Sur la motion du Dr. Bowman, le Prof. Mielck est élu Président pour l'année prochaine.

APPENDICE No. 1

Distribution des larves de hareng dans la Mer du Nord en hiver (Nov.-Avril).

Prof. Mielck, Helgoland.

Pour obtenir un aperçu général sur la distribution et les conditions quantitatives des larves de hareng dans la Mer du Nord, on a combiné, pour les mois de Novembre—Avril, les données publiées dans les listes Allemandes et Hollandaises avec de nombreuses observations Allemandes nouvelles. On a pointé sur des cartes mensuelles, la situation des lieux de frayage, (après l'apparition des larves déjà libérées), la distribution et les voies de migration des larves aux divers stades de leur développement, ainsi que leur quantité dans les diverses régions.

En Novembre les larves jeunes ou d'un certain âge sont nombreuses devant les côtes orientales Anglaises, jusqu'un peu au dessus de l'embouchure de l'Humber, tandis qu'elles manquent encore devant les côtes Hollandaises et dans l'angle Sud-Est de la Mer du Nord. En Décembre de très grandes quantités de larves déjà libérées apparaissent entre les côtes Hollandaises-Belges et les côtes Anglaises, et c'est sur les Bancs de Flandre que se montrent les plus grands nombres et les stades les plus jeunes. Des accumulations ultérieures de jeunes larves sont constatées dans le Sud-Est de la Mer du Nord, sur les "Fonds d'huitres", (Janv., Févr.), et dans la région du Banc du Jutland (Janv.). Des larves avec sac vitellin se montrent en quantité considérable dans le Cattégat (Févr.—Avril), sur les côtes de Norvège (Févr.—Mars.), et au Nord du Viking Bank, (Avril). On n'a, jusqu'ici, constaté en hiver dans aucune autre région des masses de larves d'une importance approchant de celle des accumulations du Sud-Ouest de la Mer du Nord (Hoofden). La dissémination générale, dans le Sud de la Mer du Nord, se fait, au Sud du Dogger Bank vers l'Est, et à l'Est de celui-ci, vers le Nord. Les larves paraissent suivre les courants marins. Les parties médianes de la Mer du Nord sont, de Janvier à Avril, presque exemptes de larves, et dans la partie Ouest il ne s'en rencontre encore que très peu après Février. En se développant elles se rapprochent toujours des côtes. Les stades les plus âgés, précédent de peu la formation du revêtement écailleux, peuplent en grandes quantités les embouchures des fleuves.

APPENDICE No. 2.

Fluctuations du stock de Plie et de Sole dans la Baie Allemande.

Dr. Bückmann, Helgoland.

Les effets des fluctuations dans la production du fretin de la plie se manifestent dans le pourcentage des groupes d'âge du stock de la plie près de Helgoland, de 1913 à

off the German coast 1925—1928 in various seasons. The abundance of some year-classes is not the same in all parts of the coast, but, as in the case of the 1924 and 1921 year-class, may be greater off the East-Frisian coast than off the North-Frisian coast. Probably the distribution is unequal from the very youngest stages of bottom life. Investigations intended to ascertain the frequency of such ought therefore to take account of the whole extent of the coast.

The growth-rate of plaice seems not to depend exclusively on the abundance of the year-classes represented in the stock. Good and bad growth years may influence the average length of plaice at a given age, and may be witnessed by the relative breadth of the annual rings in the otoliths laid down in these years. The growth of the 0-group was quite as good in 1926 at the Elbe-stations, as it was in 1927, when there were 14 times fewer young plaice to be caught.

From autumn 1926 onwards unusual heavy catches of sole were made by German research-vessels; at times there were more than 10 times more than in previous years. This is brought about by the year-class 1924 turning out extremely abundant. In 1926 and 1927, the year-class made up 80 per cent. of the stock in the German Bight. In 1927 this maximum fluctuation effected a considerable increase in the catch of sole per voyage by the German trawl-cutters.

Transition Area Committee.

Chairman: Dr. A. C. Johansen.
The Committee met at 9,30 a. m. on June 2nd, 1928.

The Committee received the following communications —

1) Professor Henking: Investigations on the stock of plaice in the Baltic. Prof. Henking mentioned the great decrease of the stock which especially affected the females.
2) Dr. Molander: Swedish investigations on the distribution of various sizes of haddock in the Skagerak and Kattegat.
3) Dr. Johansen: The transplantation of young plaice from the North Sea and the Limfjord to the Kattegat and the Belt Sea, which has taken place in the spring of 1928. The transplantation comprised ca. 1.400.000 specimens of 14 to 26 cms. in length.
4) Mr. Sund: Review of a paper by Mr. A. Dannevig concerning the propagation of certain food-fishes in the Skagerak in the cold winter of 1924.

The following recommendation was adopted by the Committee:—

It is desirable that a short account of the work of Mr. A. Dannevig on "The propagation of the food-fishes in the Skagerak during the cold winter of 1924" should be printed in the "Rapports et Procès-Verbaux" (or in the Journal).

1927 et sur des sections perpendiculaires à la côte Allemande de 1925 à 1928, en diverses saisons. La fréquence n'est cependant pas toujours la même sur toute la côte, mais plusieurs années, comme 1924 et 1921, sont relativement plus fortes dans la région située au large de la Frise orientale qu'en face de la Frise du Nord. Il est probable que la distribution est inégale même dès les premiers âges de la vie. Pour que les recherches sur la fréquence des premiers stades de fond fournissent des résultats dignes de confiance, il faut donc qu'elles embrassent, autant que possible, toute l'étendue de la côte.

La croissance des plies paraît ne pas dépendre uniquement de la densité des groupes annuels qui composent le stock. De bonnes et de mauvaises années de croissance peuvent se présenter indépendamment d'elle, et on peut les reconnaître à la largeur relative des anneaux annuels qui se forment dans les otolithes. Avec un stock 14 fois plus dense, la croissance du groupe 0 a été, en 1926, aussi bonne qu'en 1927.

A partir de l'automne de 1926, les navires de recherches Allemands ont capturé des quantités de soles inaccoutumées et, parfois décuples de celles de l'année précédente. Cela doit être attribué au bon succès de l'année 1924, qui a fourni dans les années 1926 et 1927 environ 80 % du stock. Dans l'année 1927 l'effet de cette fluctuation maximum s'est manifestée, pour les cotres chalutiers Allemands, par un accroissement considérable de leur capture en soles, par voyage.

Comité du Secteur de Transition.

Président: le Dr. A. C. Johansen.
Le Comité se réunit á 9.30 a. m., le 2 Juin 1928.

Le Comité reçoit les communications suivantes:

1) Le Prof. Henking: Investigations sur le stock de plie dans la Baltique. Le Prof. Henking mentionne la grande décroissance du stock, qui affecte spécialement les femelles.
2) Le Dr. Molander: Investigations Suédoises sur la distribution des diverses tailles de l'églefin dans le Skagerak et le Cattégat.
3) Le Dr. Johansen: La transplantation de la jeune plie de la Mer du Nord et du Limfjord dans le Cattégat et dans la Mer des Belts, faite au printemps de 1928. Cette transplantation a compris environ 1.400.000 individus de 14 à 26 cm de long.
4) Mr. Sund: Revue d'un travail de Mr. Dannevig concernant la reproduction de certains poissons alimentaires pendant l'hiver froid de 1924.

La recommandation suivante est adoptée par le Comité:

Il est désirable qu'un court résumé du travail de Mr. A. Dannevig sur "La reproduction des poissons alimentaires dans le Skagerak pendant l'hiver froid de 1924", soit imprimé dans les "Rapports et Procès-Verbaux" (ou dans le Journal).

Programme for the ensuing year.

Plaice.

1) Special stress should be laid on the investigations in the Kattegat in order to get a scientific basis for further measures to be taken regarding the protection of this species.
2) The results of the experiments with transplantation of plaice from the North Sea to the Kattegat and Belt Sea should be closely followed.

Haddock.

The seasonal distribution of the various year-classes should be studied in the Skagerak, Kattegat and Belt Sea.

The programme of 1926 (see "Procès-Verbaux" Vol. XLI) was reaffirmed in all other respects.

Dr. A. C. Johansen was re-elected as Chairman for the ensuing year.

Baltic Area Committee.

Chairman: Dr. K. A. Andersson.
The Committee met at 2,30 p. m. on June 2nd, 1928.

The Chairman opened the meeting and asked the members to report on the work carried out during 1927.

1) Dr. Johansen gave an account of the Danish investigations on herring larvae, their numbers and distribution in the Southern Baltic.
2) Professor Dr. Siedlecki spoke of the investigations in Poland on the flounder and also on the influence of trawling on the stock.
3) Dr. Strodtmann discussed the German investigations on the flounder in the Bornholm Basin and pointed out that the stock is decreasing rapidly and that protection of the flounder was needed.
4) Professor Witting described the hydrographic investigations and echo-soundings in the northern part of the Baltic.
5) Dr. Andersson gave an account of the Swedish investigations on the zoo-plankton in different parts of the Baltic and pointed out that the amount of zoo-plankton varied greatly, being abundant in the Gulf of Bothnia and in the Gulf of Riga and in the Bornholm area, but relatively poor in the central part of the Baltic. He also discussed the fluctuations in the stock of herring on the Swedish coast of the Baltic.

Programme for the ensuing year.

It was recommended that investigations should be continued during the ensuing year, in accordance with the programme adopted in 1926. The Committee attached special importance to the following investigations:—

Programme pour l'année prochaine.

Plie.

1) On devrait insister spécialement sur les investigations dans le Cattégat en vue d'obtenir une base scientifique pour prendre ultérieurement des mesures de protection en faveur de cette espèce.
2) Les résultats des expériences de transplantation de la plie de la Mer du Nord dans le Cattégat et la Mer des Belts devraient être suivis de près.

Eglefin.

La distribution saisonnière des diverses classes annuelles devrait être étudiée dans le Skagerak, le Cattégat et la Mer des Belts.

Le programme de 1926 (voir les Procès-Verbaux, Vol. XLI) est confirmé à tous les autres points de vue.

Le Dr. A. C. Johansen est réélu Président pour l'année prochaine.

Comité du Secteur Baltique.

Président: le Dr. K. A. Andersson.
Le Comité se réunit à 2.30 p. m., le 2 Juin 1928.

Le Président ouvre la séance et demande aux membres de faire rapport sur le travail exécuté en 1927.

1) Le Dr. Johansen donne un résumé des investigations Danoises sur les larves de hareng, leur nombre et leur distribution dans la Baltique méridonale.
2) Le Prof. Siedlecki parle des investigations faites en Pologne sur le flet, et aussi sur l'influence du chalutage sur le stock.
3) Le Dr. Strodtmann discute les investigations Allemandes sur le flet dans le bassin de Bornholm; il montre que le stock est en décroissance rapide et que la protection du flet est nécessaire.
4) Le Prof. Witting décrit les investigations hydrographiques et les sondages par écho dans la partie Nord de la Baltique.
5) Le Dr. Andersson donne un résumé des investigations Suédoises sur le zooplancton dans diverses parties de la Baltique et montre que la quantité de zooplancton varie beaucoup: il est abondant dans le Golfe de Bothnie, dans le golfe de Riga et dans l'aire de Bornholm, mais relativement pauvre dans la partie centrale de la Baltique. Il discute aussi les fluctuations du stock de harengs sur la côte Suédoise de la Baltique.

Programme pour l'année prochaine.

Il est recommandé que des investigations soient poursuivies pendant l'année prochaine conformément au programme adopté en 1926. Le Comité attache une importance spéciale aux investigations suivantes:

Herring.

1) Determination of the races which are of the greatest economic importance in different parts of the Baltic.
2) Studies of the fluctuations of the stock by means of age-determinations, carried out over as wide an area as possible.
3) Study of the distribution of larval herrings in order to determine the spawning grounds and to ascertain as early as possible whether the spawning season was favourable or otherwise.

Plaice.

1) Continuation of the investigations of the stock of plaice in the southern Baltic.
2) Studies of the abundance and distribution of the 0-Group.

Flounder.

1) Investigations as to the destructive effect of the ordinary fishing gear.
2) Investigations for the purpose of ascertaining whether further protection for the flounder is necessary in the Baltic.

Salmon and Sea-Trout.

1) Collection of statistics of the catch of small salmon and sea-trout.
2) In collaboration with the Limnological Committee:—
   a) Study of the characteristics distinguishing salmon from sea-trout.
   b) Marking experiments on young salmon and sea-trout in the rivers.
   c) Investigations on the rate of growth of salmon and sea-trout in the Baltic.

Hydrography.

Studies of the content and distribution of nitrogen compounds in sea-water, specially with regard to the influence of the rivers.

The Committee re-elected Dr. K. A. Andersson as Chairman for the ensuing year.

Hareng.

1) Détermination des races dont l'importance économique est la plus grande dans différentes parties de la Baltique.
2) Etude des fluctuations du stock par la méthode des déterminations d'âge pratiquée sur une aire aussi large que possible.
3) Etude de la distribution des larves de hareng, en vue de déterminer les champs de ponte et de reconnaître le plus tôt possible si la saison de ponte a été favorable ou non.

Plie.

1) Continuation des investigations sur le stock de plie dans le Sud de la Baltique.
2) Etude de l'abondance et de la distribution du groupe 0.

Flet.

1) Investigations sur l'effet destructeur des engins de pêche ordinaires.
2) Investigations tendant à décider s'il est nécessaire de développer la protection du flet dans la Baltique.

Saumon et truite de mer.

1) Réunion de données statistiques sur la capture du saumon et de la truite de mer de petite taille.
2) En collaboration avec le Comité limnologique:
   a) Etude des caractères distinctifs du saumon et de la truite de mer.
   b) Expériences de marquage du saumon et de la truite de mer jeunes, dans les rivières.
   c) Investigations sur la rapidité de croissance du saumon et de la truite de mer dans la Baltique.

Hydrographie.

Etude de la quantité et de la répartition des composés azotés dans l'eau de mer, particulièrement en rapport avec l'influence des rivières.

Le Comité réélit le Dr. K. A. Andersson comme Président pour l'année prochaine.

Programmes and Reports of other Committees.

Hydrographical Committee.

Chairman: Professor Martin Knudsen.
The Committee met on May 31st and June 1st, 1928.

I) Salinity Normals. The proposals contained in the Report, Appendix No. 1, were adopted.

II) Bulletins. The proposals contained in the Report, Appendix No. 2, were adopted. As members of the Sub-Committee proposed under point IV Messrs. R. de Buen, le Danois, Knudsen, Lumby, O. Pettersson, Ramalho, van Riel (failing him van Everdingen), and Schott were elected.

III) Organisation of the Service Hydrographique. The proposals contained in the Report, Appendix No. 3, were adopted after the two last points, viz. nos. 3 and 4, had been withdrawn by the Sub-Committee.

IV) Mr. van Riel proposed to collect observations from certain squares of the Atlantic (Appendix No. 4). The proposal was referred to the Committee mentioned under II.

V) Professor Witting proposed that monthly means of sea-level determinations should be printed in the Bulletin. The proposal was adopted.

VI) It was resolved to collect water-samples for the determination of the ratio SO_4/Cl and that the Service Hydrographique should circulate letters to that effect to the participating countries.

VII) It was resolved to submit the following topics as suitable for treatment at the scientific meeting during next year's Council Meeting: 1) Nitrates and phosphates if not finished this year, 2) Current-determinations direct and indirect, 3) Salinity-determinations, 4) Echo-sounding.

VIII) A letter, Appendix No. 6, was received from Professors J. Giral and R. de Buen with the request that it should be handed over to the Bureau.

IX) Mr. Borley and Mr. Matthews having informed the Committee that the British Admiralty might be in a position to carry out hydrographical investigations off the west coast of Scotland at the end of August 1928 and to repeat the investigations on an extended scale in 1929 the Committee expressed a very strong desire that such work might be undertaken. To ensure co-operation between these researches if undertaken and those carried out by Scotland and Norway a Committee consisting of Messrs. Borley, Bowman, Matthews, Sund, and Ehrenbaum was appointed.

Programmes et Rapports des autres Comités.

Comité Hydrographique.

Président: le Prof. Martin Knudsen.
Le Comité se réunit le 31 Mai et le 1 Juin, 1928.

I) Normales de salinité. Les propositions contenues dans le Rapport, Appendice No. 1, sont adoptées.

II) Bulletin. Les propositions contenues dans le Rapport, Appendice No. 2, sont adoptées. MM. R. de Buen, le Danois, Knudsen, Lumby, O. Pettersson, Ramalho, van Riel (ou, à défaut, van Everdingen) et Schott, sont élus membres du Sous-Comité proposé au No. IV.

III) Organisation du Service Hydrographique. Les propositions contenues dans le Rapport, Appendice No. 3, sont adoptées, après le retrait des deux derniers points, No. 3 et No. 4, par le Sous-Comité.

IV) Mr. van Riel propose de réunir les observations faites dans certains rectangles de l'Atlantique. (Appendice No. 4). La proposition est référée au Comité mentionné au No. II.

V) Le Prof. Witting propose que des moyennes mensuelles des déterminations du niveau de la mer soient imprimées dans le Bulletin. La proposition est adoptée.

VI) Il est décidé de recueillir des échantillons d'eau pour la détermination du rapport SO_4/Cl, et de charger le Service Hydrographique d'adresser, dans ce but, des circulaires aux divers pays participants.

VII) Il est décidé de signaler les sujets suivants comme pouvant être traités aux réunions scientifiques durant l'Assemblée du Conseil, l'année prochaine: 1) Nitrates et phosphates, si leur étude n'est pas terminée cette année, 2) Déterminations de courants, directes et indirectes, 3) Déterminations de salinité, 4) Sondage par écho.

VIII) Une lettre, Appendice No. 6, est remise par les Professeurs J. Giral et R. de Buen, avec demande de transmission au Bureau.

IX) Mr. Borley et Mr. Matthews font savoir au Comité que l'Amirauté Britannique pourra se trouver en mesure de poursuivre des investigations hydrographiques au large de la côte Ouest d'Écosse à la fin d'Août 1928 et de répéter ces investigations sur une échelle plus étendue en 1929. Le Comité exprime un vif désir de voir ces recherches entreprises. En vue d'assurer une coopération entre ces recherches, si elles sont entreprises, et celles qui sont poursuivies par l'Écosse et la Norvège, un Comité composé de MM. Borley, Bowman, Matthews, Sund et Ehrenbaum est nommé.

X) Professor O. Pettersson proposed to have monthly mean temperature charts worked out by the Danish Meteorological Institute and to recommend to the Bureau to pay the amount involved for the charts for February, May and November. The proposal was adopted.

XI) Mr. Borley intimated that he probably could not come to subsequent meetings and proposed that Mr. Carruthers or Mr. Lumby should replace him on the Committee. The proposal was adopted.

Professor Knudsen was re-elected Chairman for the ensuing year.

APPENDIX No. 1

Report from Hydrographical Sub-Committee on Salinity Normals.

The Sub-Committee was appointed by the Council at its meeting in Stockholm in May 1927 (see Recommendation III on p. 68 of Rapports et Procès-Verbaux, Vol. XLV).

The Sub-Committee met during the periods 3rd to 5th of November 1927 and 19th to 24th of April 1928.

The following considerations are submitted:—

I) The end in view is the establishment of charts giving surface salinity normals and deviations (mean) for the North Sea.

II) In the attempt to reach this end, the following preparatory work shall be carried out:

1) All salinity observations that can be obtained relating to the surface of the North Sea should be tabulated a) by rectangles bounded by lines of Latitude and Longitude and b) by "decades" (1st to 10th, 11th to 20th, 21st to the last day of any calendar month).

2) The ultimate size of these rectangles (which should however be as small as practicable), the arrangement of the record forms for tabulation of the data, and any other details of procedure arising in the course of the work should be decided by the chairman of the Hydrographical Committee, keeping in view the principle that both rectangles and forms should still be suitable when the quantity of data now available is increased.

3) With each salinity observation shall be recorded its date and position.

4) The observations in any single year shall be recorded separately.

III) The work done should be submitted to the chairman of the Hydrographical Committee not later than the 31st March 1929.

IV) After the completion of this preliminary work, further steps should be proposed by the Service Hydrographique.

(signed) Martin Knudsen. J. R. Lumby. P. M. van Riel. Schott.

X) Le Prof. O. Pettersson propose de demander à l'Institut Météorologique Danois de préparer des cartes mensuelles de température moyenne, et de recommander au Bureau de payer le montant de la dépense pour les cartes de Février, de Mai et de Novembre. La proposition est adoptée.

XI) Mr. Borley fait connaître qu'il ne pourra probablement pas assister aux réunions prochaines et propose que Mr. Carruthers ou Mr. Lumby le remplacent dans le Comité. Cette proposition est adoptée.

Le Prof. Knudsen est réélu Président pour l'année prochaine.

APPENDICE No. 1

Rapport du Sous-Comité Hydrographique sur les Normales de Salinité.

Ce Sous-Comité a été nommé par le Conseil à son Assemblée de Stockholm en Mai 1927 (voir Recommandation III, p. 69 des Rapports et Procès-Verbaux, Vol. XLV).

Le Sous-Comité s'est réuni pendant les périodes du 3 au 5 Novembre 1927 et du 19 au 24 Avril 1928.

Les considérations suivantes sont formulées:

I) Le but en vue est l'établissement de cartes donnant les normales de salinité de surface et les déviations (moyennes) pour la Mer du Nord.

II) Comme tentative pour atteindre ce but, le travail préparatoire suivant sera exécuté:

1) Toutes les observations de salinité de surface concernant la Mer du Nord que l'on pourra obtenir seront tabulées a) par rectangles limités par des lignes de latitude et de longitude, et, b) par "décades" (du 1er au 10, du 11 au 20, du 21 au dernier jour de tout mois).

2) La limite de grandeur de ces rectangles (qui, toutefois, devront être aussi petits qu'il est pratique de les faire), l'arrangement des formules pour la tabulation des données, et tous les autres détails de procédure qui se révéleront au cours du travail, seront décidés par le Président du Comité Hydrographique, en tenant compte du principe que rectangles et formules doivent rester employables quand la quantité de données dont on dispose aujourd'hui se sera accrue.

3) La date et la position doit être indiquée avec toute observation de salinité.

4) Les observations de chacune des années seront inscrites séparément.

III) Le travail accompli sera soumis au Président du Comité Hydrographique, au plus tard le 31 Mars 1929.

IV) Après l'achèvement de ce travail préliminaire, des mesures ultérieures seront proposées par le Service Hydrographique.

(signé) Martin Knudsen. J. R. Lumby. P. M. van Riel. Schott.

APPENDIX No. 2

Report from Hydrographical Sub-Committee on Bulletins.

The Sub-Committee was appointed by the Council at its meeting in Stockholm in May 1927 (see Recommendation II on p. 68 of Rapports et Procès-Verbaux, Vol. XLV).

The Sub-Committee (Mr. Borley replaced by Mr. Lumby) met during the periods 3rd to 5th of November 1927 and 19th to 24th of April 1928.

The following considerations are submitted by the undersigned:—

I) To maintain the functions which the Bulletin Trimestriel was intended to serve, i. e., the rapid dissemination of information, the following procedure should be adopted:

On the arrival of the hydrographical material at the Bureau of the Service Hydrographique the tables should at once be inspected and sent to the printer for setting up in such a form that the blocks can afterwards be used for the Bulletin Hydrographique. Off-prints taken from these blocks should be available to interested workers and should be supplied from month to month.

II) Charts or diagrams, for the North Sea only, containing observations plotted on them and as far as possible with normal curves in the background should be supplied from month to month to interested workers on request.

III) The Bulletin Hydrographique, continuing to be published mainly in the same form as hitherto, should have for its chief function the constitution of a complete tabular record of the hydrographical data.

IV) The further need for amplification and completion of the services towards which the Bulletin Trimestriel was directed, especially in regard to the surface of the Atlantic, could best be met by the publication of charts, diagrams, text and tables either in or as appendices to the Bulletin Hydrographique, whenever adequate material is available. To discuss these points further and to make proposals thereon to the Hydrographical Committee a Sub-Comittee should be appointed.

(signed) Martin Knudsen. J. R. Lumby. P. M. van Riel. Schott.

APPENDIX No. 3

Report from Hydrographical Sub-Committee on Organisation of the Service Hydrographique.

The Sub-Committee was appointed by the Council at its meeting in Stockholm in May 1927 (see Recommendation 6 on p. 48 of Rapports et Procès-Verbaux, Vol. XLV).

The Sub-Committee met during the periods 3rd to 5th of November 1927 and 19th to 24th of April 1928.

APPENDICE No. 2

Rapport du Sous-Comité Hydrographique sur les Bulletins.

Le Sous-Comité a été nommé par le Conseil, dans son Assemblée de Stockholm en Mai 1927 (voir Recommandation II, p. 69 des Rapports et Procès-Verbaux, Vol. XLV).

Le Sous-Comité (Mr. BORLEY étant remplacé par Mr. LUMBY) s'est réuni pendant les périodes du 3 au 5 Novembre 1927 et du 19 au 24 Avril 1928.

Les considérations suivantes sont formulées par les soussignés:

I) Pour assurer les fonctions que le Bulletin était destiné à remplir, c'est-à-dire la dissémination rapide de l'information, la procédure suivante devrait être adoptée:

A l'arrivée du matériel hydrographique au Bureau du Service Hydrographique, les tables devraient être immédiatement inspectées et envoyées à l'imprimeur pour être composés sous une forme telle que les blocs puissent être employés ultérieurement pour le Bulletin Hydrographique. Des tirés-à-part de ces blocs devraient être à la disposition des travailleurs intéressés et leur être fournis de mois en mois.

II) Des cartes ou des diagrammes, pour la Mer du Nord seulement, contenant des observations pointées sur elles, et, autant que possible sur un fond portant des courbes normales, devraient être fournies, de mois en mois, aux travailleurs intéressés, sur leur demande.

III) Le Bulletin Hydrographique, tout en conservant la même forme générale que précédemment, aura pour fonction principale la constitution d'un recueil tabulaire complet des données hydrographiques.

IV) On pourrait répondre aux besoins ultérieurs de développement et de complément des services auxquels le Bulletin Trimestriel était destiné, surtout pour ce qui concerne la surface de l'Atlantique, par la publication de cartes, de diagrammes, de textes et de tables, soit dans le Bulletin Hydrographique, soit comme appendices, chaque fois qu'on obtiendra du matériel. Un Sous-Comité devrait être nommé pour discuter davantage ces points et pour faire à leur sujet des propositions au Comité Hydrographique.

(signé) MARTIN KNUDSEN. J. R. LUMBY. P. M. VAN RIEL. SCHOTT.

APPENDICE No. 3

Rapport du Sous-Comité sur l'Organisation du Service Hydrographique.

Le Sous-Comité a été nommé par le Conseil à son Assemblée de Stockholm en Mai 1927 (voir la Recommandation 6, p. 49 des Rapports et Procès-Verbaux, Vol. XLV).

Le Sous-Comité s'est réuni pendant les périodes du 3 au 5 Novembre 1927 et du 19 au 24 Avril 1928.

The following considerations are submitted:—

Activities.

A scientific Service Hydrographique centered in Copenhagen will always be essential to the Bureau because the Bulletin Hydrographique is a hydrographical necessity.

The activities on which the Service Hydrographique should thus be engaged are:—

1) to prepare the material for the publication of the Bulletin Hydrographique,
2) to undertake the rapid dissemination of hydrographical observations,
3) to combine data in diagrams and charts, for special areas,
4) to undertake the technical sponsorship of hydrographical publications of the Bureau,
5) to further unification of the work and collaboration between the workers in the several participating countries,
6) to draw attention to changes and amplifications which appear to be desirable in the hydrographical programmes,
7) to carry out any other hydrographical work that may be entrusted to it by the Council.

Personnel.

The Sub-Committee makes the following proposals in relation to the personnel:—

1) Professor Knudsen should be asked by the Bureau to be "Chef du Service Hydrographique" at the office in Copenhagen, and to undertake the general supervision of all hydrographical work in the service.
2) Dr. I. P. Jacobsen should be asked by the Bureau to be Hydrographer at the office in Copenhagen and attend to the daily work.
3) The appointment of assistants for hydrographical work, formerly in the hands of the General Secretary, shall be undertaken by the "Chef du Service".
4) The foregoing proposals relating to the personnel of the Service Hydrographique shall hold good only if the proposals relating to the technical questions (Activities of Service Hydrographique, Bulletins, Salinity Normals) be accepted in their essential points.

(signed) Martin Knudsen. J. R. Lumby. P. M. van Riel. Schott.

APPENDIX No. 4

Memorandum on hydrographical observations in the Atlantic Ocean.

1) For studying the causes of important fluctuations in salinity and surface temperature in the English Channel and the North Sea, the extension of the field of research towards the West (the Atlantic Ocean) is necessary.
2) In this connection it would be of much value if the very numerous surface temperature-observations, entered in logbooks and on ships-formulars collected by various Institutes were at our disposal.

Les considérations suivantes ont été formulées:

Activité.

Un Service Hydrographique scientifique ayant son centre à Copenhague sera toujours nécessaire au Bureau, parceque le Bulletin Hydrographique est une nécessité.

Les fonctions qui doivent constituer l'activité du Service Hydrographique sont:

1) de préparer le matériel pour la publication du Bulletin Hydrographique,
2) d'entreprendre la répartition rapide des observations hydrographiques,
3) de combiner des données en diagrammes et en cartes pour des aires spéciales,
4) d'assumer la responsabilité technique des publications hydrographiques du Bureau,
5) de pousser à l'unification du travail et à la collaboration entre les travailleurs des divers Pays participants,
6) d'attirer l'attention sur les changements et les développements des programmes hydrographiques qui paraissent désirables,
7) d'exécuter tout autre travail hydrographique qui pourrait lui être confié par le Conseil.

Personnel.

Le Sous-Comité fait les propositions suivantes au sujet du personnel:

1) Il sera demandé, par le Bureau, au Professeur Knudsen de devenir le "Chef du Service Hydrographique", à l'office de Copenhague, et d'assumer le contrôle général de tout le travail hydrographique du Service.
2) Le Dr. Jacobsen sera prié par le Bureau d'être "l'Hydrographe" de l'office de Copenhague, et de se charger du travail journalier.
3) La nomination des assistants pour le travail hydrographique, qui était précédemment aux mains du "Secrétaire Général", sera assumée par le "Chef du Service".
4) Les propositions ci-dessus relatives au personnel du Service Hydrographique ne seront valables que si les propositions relatives aux questions techniques (Activité du Service Hydrographique, Bulletins, Normales de Salinité), sont acceptées dans leurs points essentiels.

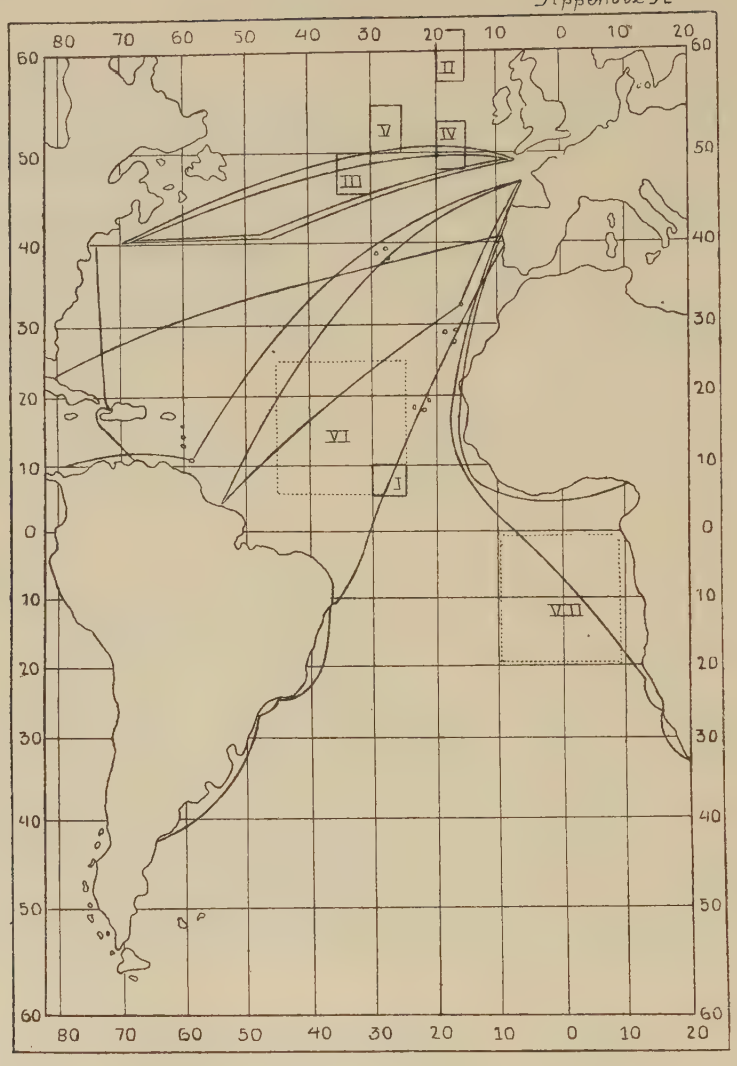
(signé) Martin Knudsen. J. R. Lumby. P. M. van Riel. Schott.

APPENDICE No. 4

Mémorandum sur les observations hydrographiques dans l'Océan Atlantique.

1) L'extension du champ de recherches vers l'Ouest (Océan Atlantique) est nécessaire pour l'étude des causes d'importantes fluctuations de salinité et de température de surface qui se produisent dans la Manche et dans la Mer du Nord.
2) A ce point de vue, il serait précieux que les très nombreuses observations de température de surface inscrites dans les livres de bord et sur des formulaires de navires, qui sont recueillies par diverses Institutions, soient mises à notre disposition.

Appendix A

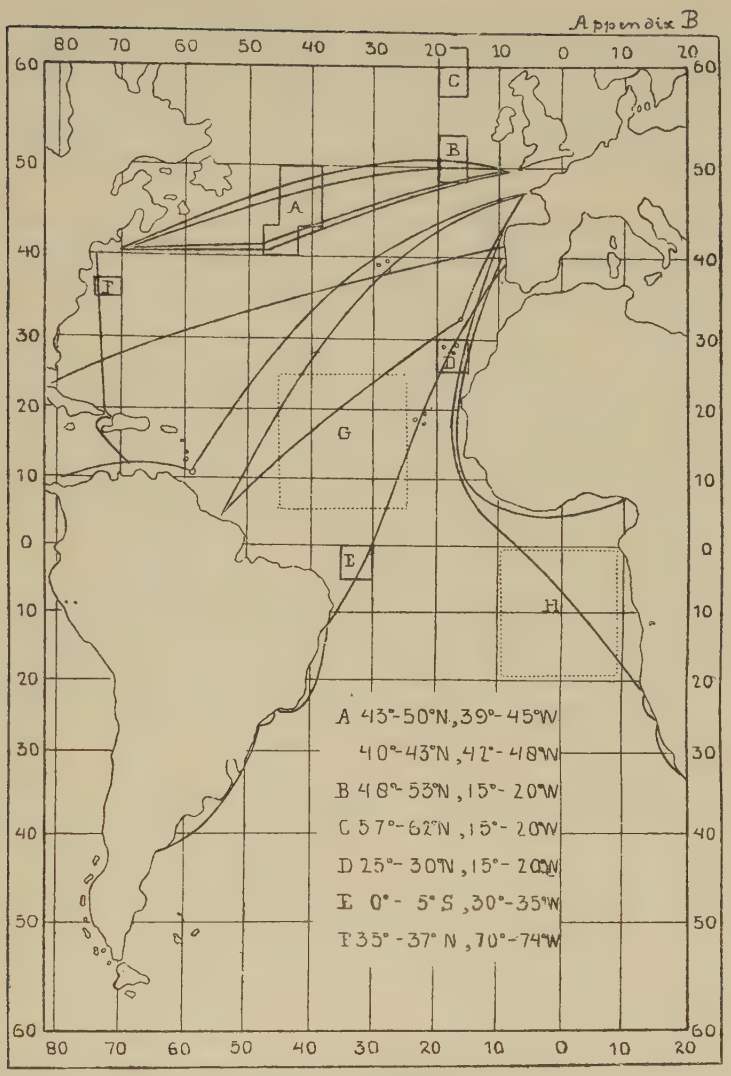


VI—VII Dutch — IV English in future.

3) The probability of seafaring countries co-operating in this matter would increase if not all available material was wanted.

4) It appears from the results, obtained by various authors that important temperature anomalies of the Ocean surface show a marked agreement over large regions. An investigation made by the Dutch Institute over a period of 50 years for seven squares in the eastern half of the Atlantic Ocean on the track Channel—New York confirms this view.

5) Hence — in order to get an insight into the important surface variations — it will not be necessary to trouble Institutes for all available material, observations in some selected key-squares being sufficient.



3) La probabilité de la coopération des nations maritimes se trouverait augmentée si on ne demandait pas tout le matériel disponible.

4) Il ressort des résultats obtenus par divers auteurs, que d'importantes anomalies de température superficielle de l'Océan montrent une correspondance marquée sur de larges étendues. Une investigation faite par l'Institut Hollandais pendant une période de 50 ans, pour sept rectangles, dans la moitié orientale de l'Océan Atlantique, sur la route Manche—New York, confirme cet aperçu.

5) Il découle de cela que, pour obtenir une information au sujet de ces importantes variations de surface, il ne sera pas nécessaire de déranger les Instituts pour en obtenir tout le matériel disponible, — des observations faites dans certains rectangles-clefs, bien choisis, suffiraient.

6) Which squares ought to be chosen is a problem in itself and will also depend on the position of regular steamship routes. For this reason the position of these squares ought to be fixed after consulting all interested countries, as soon as the question whether the data should not only embrace sea-temperature but also pressure, air-temperature and current has been settled.

7) Before a proposal is made in this matter as a basis for further discussion, it is desirable to point out, what co-operation exists at present under the control of the International Meteorological Committee and its various commissions (see: Appendix A, p. 62):—

a) The Dutch Meteorological Institute collects observations of airpressure, temperature of air and sea-surface, wind, cloudiness and precipitation from various seafaring nations (Denmark, Germany, Great Britain, Holland and United States) and publishes the monthly results for six areas among which VI and VII in the North and South Atlantic Ocean. This publication "Monthly meteorological data for ten-degrees-squares in the Oceans" appears every year.

b) The British Meteorological Office publishes on behalf of the International Commission of the Réseau Mondial an annual volume "Réseau Mondial", containing primarily monthly values of pressure, temperature and precipitation at land stations, two in a ten-degree-square. Future volumes will contain also Ocean squares of 5 degrees in Longitude and Latitude (squares I—V).

8) For oceanographical investigations we propose the squares A, B, C, D, E and F (Appendix B, p. 63) from which B and C correspond with IV and II. The other squares provide data concerning:—

A) The influence of the cold Labrador current on Atlantic water.
D) The qualities of surface water, running back to the North between 30° and 40° W. Long. along a shorter circular course.
E) The South equatorial current.
F) The Gulfstream water.

9) Investigations on oceanographical problems may be promoted if observations in these squares from past years were collected for calculating monthly normals. At all events each seafaring country should send future monthly means and numbers of observations to the Hydrographical Service at Copenhagen, which publishes the total means in the Hydrographical Bulletin.

I am convinced, that such an organisation would give results interesting meteorologists as well as hydrographers and biologists. Whatever meteorological views may be adhered to concerning the formation and travelling of depressions, the temperature of air and sea and the deviation from the normal value of these data at a certain epoch will be always considered as important, not least for long range forecasting. A certain

6) Le choix de ces rectangles est par lui même un problème, et il dépendra aussi de la position des routes de navigation régulière. Pour ce motif, la position de ces rectangles devrait être fixée après consultation de tous les Pays intéressés, aussitôt que sera décidée la question de savoir si les données demandées ne doivent embrasser que la température de la mer, ou bien aussi la pression atmosphérique, la température de l'air et le courant.

7) Avant qu'une proposition pouvant servir de base ultérieure de discussion sur ce sujet soit faite, il est à désirer que l'on établisse de quelle coopération disposent actuellement le Comité Météorologique International et ses diverses Commissions (voir Appendice A, p. 62):

a) L'Institut Météorologique Hollandais recueille des observations de pression atmosphérique, de température de l'air et de la surface de la mer, de vent, de nébulosité, et de précipitation, de différents Pays maritimes (Danemark, Allemagne, Grande Bretagne, Hollande et États Unis) et il publie les résultats mensuels pour six aires, parmi lesquelles VI et VII, dans le Nord et le Sud de l'Océan Atlantique. Cette publication: "Données météorologiques mensuelles pour des rectangles de dix degrés dans les océans" paraît chaque année.

b) L'Office Météorologique Britannique publie au nom de la "Commission internationale du Réseau Mondial", un volume annuel: "Le Réseau Mondial" contenant des valeurs mensuelles primaires de pression, de température et de précipitation, en des stations terrestres, deux dans un carré de dix degrés. Les volumes à venir contiendront aussi des carrés de 5 degrés en longitude et en latitude (carrés I—V).

8) Pour les investigations océanographiques, nous proposons les carrés A, B, C, D, E et F (Appendice B, p. 63), desquels B et C correspondent à IV et II. Les autres carrés fournissent des données concernant:

A) L'influence du courant froid du Labrador sur l'eau Atlantique.

D) Les qualités de l'eau de surface retournant vers le Nord, entre 30° et 40° de longitude Ouest, sur un trajet circulaire plus court.

E) Le courant Sud-Equatorial.

F) L'eau du Gulfstream.

9) Les investigations sur des problèmes océanographiques seraient favorisées si des observations faites dans ces carrés pendant les années passées, étaient réunies pour le calcul des moyennes mensuelles. En tout cas, chacun des Pays maritimes devrait, dans l'avenir, envoyer des moyennes mensuelles et de nombreuses observations au Service Hydrographique de Copenhague qui publie les moyennes totales dans le Bulletin Hydrographique.

Je suis persuadé que pareille organisation donnerait des résultats intéressant les météorologistes aussi bien que les hydrographes et les biologistes. Quelles que soient les vues météorologiques que l'on partage au sujet de la formation et de la marche des dépressions, la température de l'air et de la mer et la déviation de la valeur normale de ces données à une certaine époque, seront toujours considérées comme importantes, et

effort may therefore confidently be asked from meteorologists to assist us in finding out the relative importance of the various factors, which cause variations in the circulation of the Oceans.

De Bilt, March 23rd, 1928.

(signed) P. M. van Riel.

APPENDIX No. 5

Memorandum.

The "Bulletin Hydrographique" should, as before, be issued at the rate of one publication a year. It is to contain the results, in the form of tables[1]), of the scientific observations made by the International Sea-Research.

The tables contain observations on the salinity, density, temperature, gas-content, ionisation and alcalinity of the sea-water, as well as plancton-content as far as same is quantitatively determined that is, from the content of plancton in a measured quantity of sea-water at a given depth. The Bulletin has a special section devoted to the determinations of such plancton.

It would not do to debar entirely the research of plancton from its original place in the Bulletin of the Central Bureau, and the withdrawal of the "Bulletin Planctonique" after the war, has given rise to quite justified complaints. Nor is there any reason to renew the planctonic bulletin in its previous form, that is: with extensive tables over qualitative and arbitrary data about the plancton-organisms found, accompanied by the indications r, rr and so on, for the frequence of the various sorts. After 14 years of thorough researches on the sorts of plancton-animals and plants found in the Northern Seas, these plancton floras and faunas of the sea can be looked upon as sufficiently known for the aim of the International Sea-Research through the contents of the previously published Plancton Bulletin and plancton Resumés[2]), so the time has probably come to resort to another method of research. Such is, for instance, the aim of the research-expeditions now sent from the Scandinavian countries to study simultaneously the biological and hydrographical conditions, with the economically so important spawning-places of sea-fish, in order to find out the temperature, salinity etc., needed by fish-eggs and fish-larvae for their development, and of the quantity of plancton available for the feeding of young fish. This requires a quantitative determination of the content of plancton in

[1]) At the beginning of the international work, when the periodic courses were effected, the "Bulletin Hydrographique" contained not only tables but also charts and sections with isotherms and isohalines drawn up in these sections. Such representations are now no longer necessary, the lines of research not being determined in advance and being chosen by the hydrographers freely in the various countries that are sure to wish to reserve to themselves the right of working out the results obtained by them in their own publications. The Central Bureau can only ask that the figure-results be sent immediately they are ready to the redaction of the "Bulletin Hydrographique" which has the character of Archives for the scientific observations made by the International Sea-Research.

[2]) If new plancton-forms for our seas should be found, it would be best to give the information in special publications.

particulièrement pour les prévisions à longue échéance. On peut donc, avec confiance, demander des météorologistes un certain effort pour nous aider à découvrir l'importance relative des divers facteurs qui causent des variations dans la circulation des Océans.

De Bilt, 3 Mars 1928.

(signé) P. M. van Riel.

APPENDICE No. 5

Mémorandum.

Le »Bulletin Hydrographique« doit paraître comme auparavant en une publication par année. Il doit sous forme de tables[1]) contenir les résultats des propres observations scientifiques pour l'Exploration Internationale de la Mer.

Les tables contiennent des observations sur la salinité, la densité, la température, le contenu de gaz, l'ionisation et l'alcalinité de l'eau de mer, ainsi que le contenu de plancton en tant qu'il soit déterminé quantitativement, c'est-à-dire le contenu de plancton d'une certaine quantité d'eau de mer mesurée à une certaine profondeur. Le Bulletin a une section spéciale consacrée à la détermination de ce plancton.

Il n'est pas possible d'exclure complètement l'investigation du plancton de sa place originale dans le Bulletin du Bureau Central, et l'annulation après la guerre du »Bulletin Planctonique« a donné lieu à des plaintes justifiées. Pourtant il n'y a non plus aucune raison de reprendre le bulletin planctonique dans sa forme antérieure, c'est-à-dire avec des tables étendues sur des données qualitatives et arbitraires concernant l'organisme du plancton, accompagnées des indications r, rr etc., pour la fréquence des différentes sortes. Après 14 ans de recherches approfondies sur les sortes de plancton animal et végetal des mers du nord, cette flore et cette faune planctonique peuvent être considérés comme suffisamment bien connues pour le but de l'Exploration Internationale de la Mer, par les contenus des Bulletins et Résumés planctoniques[2]) publiés préalablement de sorte que l'on peut consacrer le temps à d'autres méthodes d'investigations. Tel est, par exemple, le but des expéditions investigatrices envoyées maintenant par les pays scandinaves pour étudier les conditions biologiques et hydrographiques des lieux de frai des poissons de mer si importants au point de vue économique, afin de trouver la température, la salinité, etc. exigées par les œufs et les larves de poisson pour leur développement et la quantité de plancton nécessaire à la nourriture du jeune poisson.

[1]) Au début du travail international, quand la manière périodique a été adopté, le »Bulletin Hydrographique« ne contenait pas seulement des tables, mais aussi des cartes marines et des diagrammes avec isothermes et isohalines. Ces figures ne sont plus nécessaires, les lignes de recherches n'étant plus déterminées d'avance, mais choisies librement par les hydrographes dans les différents pays qui sont sûrs de leur réserver le droit d'exposer dans leurs publications particulières les résultats obtenus par eux. Le Bureau Central peut seulement demander que les résultats des figures soient envoyés immédiatement à la rédaction du »Bulletin Hydrographique« qui a ainsi le caractère d'Archives pour les propres observations de l'Exploration Internationale de la Mer.

[2]) Si l'on trouvait dans nos mers de nouvelles formes de plancton, il vaudrait mieux en donner connaissance dans des publications spéciales.

a given quantity of sea-water. The methods for such determinations are now in existence and the results of such measuring must be as important to know as hydrographical data and must be registered in the same publication of the "Bulletin Hydrographique", although in a special section, for quantitative determinations effected according to rational methods, for instance, such as those introduced by HENSEN, that is, by means of calculation or weighing. If the results of such expeditions are sent in table-forms to the Central Bureau, the compilation of these tables into the forms that have long been in use at the redaction of the "Bulletin Hydrographique" should not present a very difficult task.

Bulletin Trimestriel.

While the "Bulletin Hydrographique" contains, as a whole, observations of deep sounding-series effected during expeditions carried out on the exploring-ships of the International Sea-Research, the "Bulletin Trimestriel" is to contain all observations of surface-water carried out on board steamers from all countries and on light-ships and at coast-stations, which observations are compiled in tables and charts in order to afford a survey of the condition of the surface of the sea and of the changes occurring every year during the various seasons. The tables contain all surface-observations sent in. The charts show the conditions of temperature and salinity during a given season represented by a typical month: February, May, August, November.

Such a chart representing the mean normal isotherms for 43 years of the N. Atlantic in the month of August has been prepared by the scientific staff of the Danish Meteorological Institute and offered gratuitously to the hydrographic office of the Central Bureau. The present chief of the hydrographic Office, Dr. WILHELM PETTERSSON, who obtained from Professor LA COUR the permission to use this chart, made a lithographic reproduction of it with the isotherms for the month August 1926 inserted (in red) together with a Special containing the departures from the normal state denoted by the signs + and — so that the excess or deficiency in the temperature of the surface water of the Ocean in the summer season of that year appears showing that the eastern part of the Atlantic along the coast of Europe from Spain to Iceland including the N. Sea and the Norwegian Sea was warmer and the middle part colder than usual, which is of importance because charts from other years published in the Bulletin Trimestriel bear out the fact that such areas of higher temperature ("pleions") have a tendency to slowly alter their position moving from West to East with the waters of the Atlantic current.

In the accompanying charts of salinities the distribution of waters of tropical, boreal and arctic origin is represented by isohalines (in blue) of 35, 34, 33 and 32 $^0/_{00}$ Salinity drawn according to the analytical data sent to the Service Hydrographique in Copenhagen from hydrographic laboratories in different countries. Although this material has of late been delivered very irregularly from certain countries the chart will in a certain

Ceci exige la détermination quantitative du contenu de plancton dans une certaine quantité d'eau de mer. Les méthodes pour cette détermination sont maintenant en existence et le résultat de ces mesures est aussi important à connaître que les données hydrographiques, et doit être enregistré dans la même publication du »Bulletin Hydrographique«, quoique dans une section spéciale, pour les déterminations quantitatives effectuées selon les méthodes rationnelles, par ex., celles introduites par Hensen, c'est-à-dire au moyen de calculs et de poids. Si le résultat de ces expéditions est envoyé sous forme de tables au Bureau Central, la compilation de ces tables sous la forme depuis longtemps en usage à la rédaction du »Bulletin Hydrographique« ne peut présenter de très grandes difficultés.

Bulletin Trimestriel.

Tandis que le »Bulletin Hydrographique« contient, en général, des observations sur les séries de sondage de profondeur effectuées pendant les expéditions entreprises par les bateaux de recherche particuliers de l'Exploration Internationale de la Mer, le »Bulletin Trimestriel« doit contenir toutes les observations sur la surface de la mer exécutées à bord des steamers de tous pays et sur les bateaux-phares et aux stations côtières, observations qui doivent être recueillies dans des tables et cartes marines dans le but de présenter un coup d'œil général des conditions de la surface de la mer et des changements qui surviennent chaque année pendant les différentes saisons. Les tables contiennent toutes les observations de surface envoyées. Les cartes montrent les conditions de température et de salinité pendant une saison indiquée et représentée par un mois typique: février, mai, août, novembre.

Une telle carte représentant la moyenne normale des isothermes dans le nord de l'Atlantique pendant 43 ans, au mois d'août, a été préparée par les soins du personnel scientifique de l'Institut Météorologique danois et offerte gratuitement au Service Hydrographique du Bureau Central. Le chef actuel du Service Hydrographique, le Dr. Wilhelm Pettersson, ayant obtenu du Professeur La Cour la permission d'utiliser cette carte, en a fait une reproduction lithographique avec les isothermes pour le mois d'août 1926 insérés en rouge, et accompagnée d'un supplément contenant, notées par les signes + et —, les modifications de l'état normal, de sorte que les excès et les baisses de la température de la surface de l'eau de l'Océan dans l'été de cette année apparaissent, montrant que la partie orientale de l'Atlantique le long de la côte européenne de l'Espagne jusqu'en Islande, y compris la Mer du Nord et la mer de Norvège, était plus chaude que d'habitude et le milieu plus froid, ce qui est important parce que les cartes d'autres années publiées dans le »Bulletin Trimestriel« montrent le fait que les aires de si haute température (»pleions«) ont une tendance à changer lentement de position en se mouvant de l'ouest à l'est avec les eaux du courant atlantique.

Dans les cartes de salinité, la distribution des eaux d'origine tropicale, boréale et arctique, est représentée par isohalines (en bleu) de 35, 34, 33 et 32 $^0/_{00}$ de salinité, tirées suivant les données analytiques envoyées au Service Hydrographique de Copenhague par les laboratoires hydrographiques de différents pays. Quoique, dans les derniers temps, ce matériel ait été remis très irrégulièrement par certains pays, cette carte peut

degree account for the actual state of the current system of the N. Atlantic at the epoch in question. The Special contains a chart of the tracks of the steamers that have collected water-samples for the analyses.

It has cost a great deal of organisatory work to arrange the intercourse with the contributors of analytical and statistical dates by correspondence, schedules etc. so, that charts and tables of this kind can be published as early as 6 or 7 weeks after the observations are taken. It is astonishing to find that even as the Service Hydrographique, which has long been hampered in its work by idle discourses and recommendations about charts projections etc., has worked out a scheme of representation of the seasonal variations in the state of the Ocean which offers a possibility to realise the aims of the Stockholm meeting, viz. that the Bulletin Trimestriel shall be continued containing text, tables and charts of the Baltic, the North Sea and the Atlantic — the present Hydrographical Committee has followed certain recommendations of a Subcommittee which tend practically to cancel the resolutions taken in Stockholm a year before by concentrating the research work almost exclusively on the North Sea.

The North Sea is the most important fishing ground of some of the nations co-operating in the international study of the Sea and merits in a high degree the attention of hydrographers. But of still greater importance from an economic and scientific point of view is the hydrography of the Atlantic Slope of the European continent and the ocean of which the North Sea is a tributary which possesses no hydrographic regime of its own but underlies the variations of the oceanic circulation. The North Sea is no *mare clausum* whose changes we can hope to ascertain by an endless endeavour to work out "salinity normals" proper for the North Sea alone. For the North Atlantic where, thanks to the Danish Meteorologists, we possess observations for the last forty years, there exists a possibility to trace normal isotherms and use them for the study of periodic changes by annual, seasonal and perhaps monthly charts as Dr. Pettersson has recommended to be done — why not use those charts?

I am convinced that my proposal concerning the future redaction of the Bulletin Trimestriel would have met with more sympathy and understanding from the hydrographers here present if it had not clashed with another matter on which the Sub-committee headed by Professor Knudsen has undertaken to make recommendations, viz. alterations in the hydrographic staff of the Bureau. It is not for me to oppose this proposal or enter into a discussion of its causes and motives. But I feel bound to express my opinion that the proposal of the Sub-committee militates against the principle urgently expressed several times at former meetings of the Council and its hydrographical Committee, viz. that the hydrographer of the Bureau should devote his whole time and labour to his task, i. e. be a whole-time hydrographer. Apart from all other duties we find that the redaction of the tables and charts of the Trimestriel is a very exacting task.

To represent the average condition of the sea during one of the typical months, in a given area (degree-field), so that all observations made within that field have their

jusqu'à un certain degré donner compte de l'état réel du système de courant du nord de l'Atlantique à l'époque en question. Le supplément donne une carte des routes des steamers qui ont recueilli les échantillons d'eau pour les analyses.

Un grand travail d'organisation a été nécessaire pour arranger la communication entre les collaborateurs pour les données analytiques et statistiques, par correspondance, cédules, etc., de façon à ce que les cartes et tables puissent être publiées déjà 6 ou 7 semaines après que les observations ont été faites. On est étonné de voir que, quand bien même le Service Hydrographique a été longtemps troublé dans son travail par de vaines discussions et recommandations à propos des cartes, projections, etc., il est arrivé à un schème de représentation des variations saisonnières de l'Océan permettant la possibilité de réaliser le but du Congrès de Stockholm, soit que le Bulletin Trimestriel doit continuer à contenir le texte, les tables et les cartes de la Baltique, de la Mer du Nord et de l'Atlantique, le Comité Hydrographique actuel ayant suivi certaines recommandations d'un Sous-Comité qui, en concentrant presque exclusivement à la Mer du Nord l'œuvre d'investigation, tend à annuler pratiquement les résolutions prises à Stockholm une année auparavavant.

La Mer du Nord est l'aire de pêche la plus importante pour quelques-unes des nations qui coopèrent aux études internationales de la mer et elle mérite au plus haut degré l'attention des hydrographes. Mais tant au point de vue économique qu'au point de vue scientifique, l'hydrographie de la partie européenne de l'Atlantique est d'une plus grande importance encore, et la Mer du Nord, étant un tributaire de l'Océan, ne possède pas de régime hydrographique en propre, mais est soumise aux variations de la circulation océanique. La Mer du Nord n'est pas une mer fermée dont nous pouvons espérer pouvoir établir les variations par la vaine tâche d'étudier, les »normes de salinité« propres seulement à la Mer du Nord. Pour l'Atlantique du Nord, où grâce aux météorologistes danois, nous avons recueilli des observations depuis 40 ans, il existe une possibilité de tracer des isothermes normaux et de les utiliser pour l'étude des variations périodiques à l'aide de cartes annuelles, saisonnières et peut-être mensuelles, comme le Dr. Pettersson a recommandé de le faire — pourquoi donc ne pas utiliser ces cartes?

Je suis convaincu que ma proposition concernant la future rédaction du Bulletin Trimestriel aurait rencontré plus de sympathie et de compréhension chez les hydrographes ici présent si elle ne s'était pas heurtée à une autre matière que le Sous-Comité, ayant en tête le Prefesseur Knudsen, a entrepris de recommander, c'est-à-dire des changements dans le personnel hydrographique du Bureau. Il ne m'appartient pas de faire opposition à cette proposition ou d'entrer en discussion sur ces causes et motifs. Mais je me sens obligé d'exprimer mon opinion que la proposition du Sous-Comité agit contre le principe instamment exposé plusieurs fois à d'autres meetings du Conseil et de ses Comités hydrographiques, soit que l'hydrographe du Bureau doit consacrer tout son temps et son travail à sa tâche, c'est-à-dire doit être un hydrographe permanent. Si nous faisons abstraction de toutes les autres tâches, nous trouvons que la rédaction des tables et des cartes du Trimestriel est une charge des plus exigeantes.

Pour représenter la condition moyenne de la mer pendant un des mois typiques, dans une aire donnée, (degree-field) de manière que toutes les observations faites dans

influence properly considered as to final results, is a technical, statistical task which, on account of the extension of the material of observation, gives a very important work and must be executed by a whole-time hydrographer.

It is desirable to get to know as quickly as possible the changes of the sea, and experience has shown that this can be done through the "Bulletin Trimestriel" already six weeks after the end of each trimester, if the correspondence with the institute from which the primary information is obtained be systematically arranged.

For this purpose, however, it will be necessary that a man devotes himself entirely to the task as a whole-time hydrographer, this being also in conformity with the preceding decision of the Council.

Concerning the persons, I agree with the recommendation made by the Sub-committee that the editorship of the "Bulletin Hydrographique" should be entrusted to Professor KNUDSEN. If Professor KNUDSEN who has already before rendered such important services to the "Bulletin Hydrographique" wishes henceforward to take an active part as redacteur of same instead of being scientific adviser in hydrography, I, for my part, am ready to second the proposal of the Sub-committee.

At his side, the redacteur needs a hydrographer assistant whose post, according to the previous considerations of the Council must be that of a whole-time hydrographer. Dr. JACOBSEN being fully qualified for the post, I wish to join the Sub-committee with a view of proposing him for the post, provided that he is to be employed at the service of the Council as a whole-time hydrographer.

If Dr. JACOBSEN as hydrographer to the Bureau intends to retain his present occupations as teacher etc. so that he can only devote a third part of his time to his duties at the Bureau I can not vote for his employment.

O. PETTERSSON.

APPENDIX No. 6

While accepting the invitation of the Oceanographical Section of the International Union of Geodesy and Geophysics the Spanish Government has decided to arrange at Seville, in April, May and June, 1929, during the International Ibero-American Exhibition, an international exhibition of instruments, used in oceanic, hydrographic and hydrologic researches.

At the same time the Spanish Government wishes to avail itself of this opportunity, of the exhibition of instruments used in Oceanography, to assemble the scientists of all the countries of the world in order to study such problems of a general kind which cannot be solved by the existing international Committees to which only a limited number of countries belong, and it intends to organise at Seville, from May 1st, 1929, an international Congress of Oceanography, marine Hydrography and continental Hydrology.

The Spanish Delegation hopes that the Council will support this important display of oceanographical and hydrological sciences with the collaboration necessary to its success.

Copenhagen, June 1st, 1928.

(signed) J. GIRAL. RAFAEL DE BUEN.

ce champs aient leur influence justement considérée en tant que résultats définitifs, une tâche technique et statistique est obligatoire, tâche qui, en raison de l'extension du matériel d'observations donne un travail très considérable et doit être exécutée par un hydrographe permanent.

Il est à désirer que l'on puisse apprendre aussi vite que possible les variations de la mer, et l'expérience a démontré que cela peut être fait par le »Bulletin Trimestriel« six semaines déjà après la fin de chaque trimestre, si la correspondance avec l'institut d'où les informations premières sont obtenues est systématiquement organisée.

Dans ce but, toutefois, il est nécessaire qu'un homme se dévoue entièrement à la tâche d'hydrographe permanent, ce qui est du reste en conformité avec la décision précédente du Conseil.

En ce qui concerne les personnalités, je suis d'accord avec la recommandation faite par le Sous-Comité que la rédaction du »Bulletin Hydrographique« doit être confiée au Professeur Knudsen si le Professeur Knudsen, qui a déjà auparavant rendu d'importants services au »Bulletin Hydrographique«, désire à l'avenir y prendre une part active comme rédacteur au lieu d'être le conseiller scientifique en hydrographie, je suis pour ma part tout disposé à seconder la proposition du Sous-Comité.

Le rédacteur a besoin à son côté d'un assistant hydrographe, dont la position, en accord avec les considérations antérieures du Conseil, doit être celle d'un hydrographe permanent. Le Dr. Jacobsen étant complètement qualifié pour ce poste, je désire me joindre au Sous-Comité pour le proposer, en stipulant la condition qu'il doit être employé au service du Conseil comme hydrographe permanent.

Si le Dr. Jacobsen veut, comme hydrographe du Bureau, conserver ses occupations actuelles de professeur, etc., de sorte qu'il ne pourra consacrer que le tiers de son temps à ses devoirs au Bureau, je ne peux pas voter pour sa nomination à ce poste.

O. Pettersson.

APPENDICE No. 6

En acceptant l'invitation faite par la Section d'Océanographie de l'Union géodésique et géophysique internationale, le Gouvernement Espagnol a décidé de réunir à Séville en Avril, Mai et Juin 1929, au moment de l'Exposition internationale Ibéro-Américaine, une exposition internationale des instruments employés dans les recherches océanographiques, hydrographiques et hydrologiques.

En même temps le Gouvernement Espagnol désire profiter de l'occasion de l'exposition d'instruments employés en océanographie pour réunir les savants de tous les pays du monde pour discuter les problèmes d'ordre général qui ne peuvent pas être résolus par les Commissions internationales existantes, auxquelles ont adhéré un nombre limité de pays, et il organisera à Séville, à partir du 1er Mai 1929, un Congrès international d'océanographie, d'hydrographie maritime et d'hydrologie continentale.

La Délégation Espagnole espère que le Conseil apportera à ces importantes manifestations des sciences océanographiques et hydrologiques la collaboration nécessaire pour leur succès.

Copenhague, 1er Juin 1928.

(signé) J. Giral. Rafael de Buen.

Plankton Committee.

Chairman: Professor Ostenfeld.
The Committee met at 10,00 on June 1st, 1928.

The Committee took note of the following communications:—

1) Professor Mielck made a preliminary report on the comparative catching power of various types of Plankton Net. Only four types have been as yet examined, viz. Nansen, Hensen and two types of Standard Net.
2) Mr. Lea demonstrated an apparatus for dividing large plankton samples into equal parts.
3) Dr. V. I. Pettersson demonstrated the plankton apparatus for quantitative investigations which he had built for the Council.

The Committee passed the following recommendations:—

I) That the grant to Professor Mielck for investigation of the catching power of the various types of nets should be extended for another year, as the amount expended up to the present time is only a small proportion of the total sum allotted, since only four types of net have been examined and it is desirable to extend the investigation to other types of net used by the participating countries, if such can be obtained.

II) That the two proposals made last year with reference to the appointment of a plankton specialist and to the extension of the Committee to include the study of Benthos, should be postponed for another year.

The Chairman was re-elected for the ensuing year.

Statistical Committee.

Chairman: Professor D'Arcy W. Thompson.
The Committee met at 11,30 a. m. on June 2nd, 1928.

The Bulletin Statistique for 1925 was laid on the table.

The following communications were received:—

1) Captain Schøning on the Statistical Bulletin for 1926.
2) Mr. Edser on tables concerning the relation between the quantity of fish taken and the duration of fishing by vessels of various types.
3) Dr. Heinrici. A proposal concerning a general enquiry regarding the basis of fishery statistics in the various countries. (See Appendix).

The following resolutions were agreed:—

I) That the several countries should prepare and forward to the Council as full information as possible of their North Sea catch of each species of fish in so far as that catch can be definitely related to the number of days' absence from port of the vessels by which it was obtained: these data being recorded separately for the various types of fishing-vessels. That these statistics should be incorporated in a new

Comité du Plancton.

Président: le Prof. Ostenfeld.
Le Comité se réunit à 10 a. m., le 1 Juin 1928.

Le Comité prend note des communications suivantes:

1) Le Prof. Mielck fait un rapport préliminaire sur le pouvoir capturant comparatif de divers types de filet à plancton. Quatre types seulement ont été examinés jusqu'ici, à savoir: ceux de Nansen, de Hensen et deux types de filet standard.
2) Mr. Lea démontre un appareil pour la division des grands échantillons de plancton en parties égales.
3) Le Dr. V. I. Pettersson démontre l'appareil à plancton pour recherches quantitatives qu'il a construit pour le Conseil.

Le Comité adopte les recommandations suivantes:

I) Que le subside accordé au Prof. Mielck pour l'étude du pouvoir capturant de divers types de filet soit étendu à une autre année, — la somme dépensée jusqu'ici n'est qu'une faible fraction de la somme totale accordée, et comme quatre types seulement ont été examinés, il est désirable que l'investigation soit étendue à d'autres types employés dans les Pays participants si on peut les obtenir.

II) Que les deux propositions faites l'année passée au sujet de la nomination d'un spécialiste planctoniste et de l'extension du Comité en vue d'inclure dans ses attributions l'étude du Benthos, soient différées encore pour un an.

Le Président est réélu pour l'année prochaine.

Comité Statistique.

Président: le Prof. D'Arcy W. Thompson.
Le Comité se réunit à 11.30 a. m., le 2 Juin 1928.

Le Bulletin statistique pour 1925 est placé sur la table.

Les communications suivantes sont reçues:

1) Le Capitaine Schøning: sur le Bulletin statistique pour 1926.
2) Mr. Edser: sur les tableaux concernant la relation entre la quantité de poisson capturé et la durée de la pêche par des navires de divers types.
3) Le Dr. Heinrici. Proposition concernant une enquête générale au sujet de la base des statistiques de pêcherie dans les divers Pays.

Les résolutions suivantes sont adoptées:

I) Que les divers Pays préparent et envoient au Conseil une information aussi complète que possible au sujet de leur capture dans la Mer du Nord pour chaque espèce de poisson, pourvu que cette capture puisse être mise en relation avec le nombre de jours d'absence du port pour les navires qui l'ont faite, ces données étant indiquées séparément pour les divers types de navires de pêche. Que ces

Table, not to be printed meanwhile in the Bulletin Statistique, but to be circulated in the first instance, among the members of the Statistical Committee.

II) That each country should draw up a report on its Sea-fishery Statistics, describing the methods employed and the sources of the information received.

Prof. D'Arcy Thompson was re-elected as Chairman for the ensuing year.

APPENDIX

Dr. Heinrici's proposal.

Each country should prepare a short account of its fishery-statistics, on similar lines to Mr. Edser's publication on the English Statistics in the Rapports et Procès-Verbaux, Vol. XXXVI. The following points, for example, should be particularly dealt with:—

1) What catch or catches do the published statistics include?
   a) Only home-craft, or also foreign vessels?
   b) Does the catch of home-craft include the catch of small boats in coastal waters?
   c) What is to be understood by the "coastal fishery"?
2) On what basis do the statistics rest?
   a) On information given by the fishermen concerned? Is this information checked or verified? If so, by what means? Are forms or schedules furnished on which to make returns?
   b) On official local returns? From inspection of ships' log-books, or other similar material?
3) To what does the statistical material extend?
   a) Species of fish? Weight of fish caught? Size-classes of the several fishes? Value? (How is the value determined or estimated?)
   b) Place of capture? How is this defined or delimited? According to areas, squares, or in what other fashion?
   c) Kind of fishing-vessels employed (Steam, Motor, Sail, etc.)?
   d) Method of fishing (Description of gear used etc.)?
   e) Duration of voyage, and time spent on fishing, etc.?

Limnological Committee.

Chairman: Professor Henking.

The Committee met on June 1st and June 7th, 1928.

The Committee took note of the following communications:—

1) Mr. Southern: The report of Dr. Redeke regarding the pollution of rivers.
2) Prof. Järvi distributed his work on Coregonus in Finland[1]), and mentioned the main results obtained.

[1]) Järvi, T. H., 1928. Über die Arten und Formen der Coregonen s. str. in Finnland. Acta Zoologica Fennica 5, and Finlands Fiskerier (Suomen Kalatalous) 10.

statistiques soient incorporées dans une nouvelle table qui ne serait pas imprimée entretemps dans le Bulletin statistique, mais qui serait distribuée en première instance aux membres du Comité Statistique.

II) Que chaque pays élabore un rapport sur la statistique de ses pêches maritimes, décrivant les méthodes employées et les sources d'informations reçues.

Le Prof. D'Arcy W. Thompson est réélu comme Président pour l'année prochaine.

APPENDICE

Proposition du Dr. Heinrici.

Chaque Pays devrait préparer un court exposé de sa statistique de pêcherie sur un plan similaire à celui de la publication de Mr. Edser sur la Statistique Anglaise dans les "Rapports et Procès-Verbaux", Vol. XXXVI. Les points suivants devraient être traités en particulier:

1) Quelle capture ou quelles captures les statistiques publiées comprennent-elles?
   a) Celle des navires nationaux seulement ou bien aussi celle des navires étrangers?
   b) La capture des navires nationaux comprend-elle celle des petits bateaux dans les eaux côtières?
   c) Que faut il entendre par pêcherie côtière?
2) Sur quelle base repose la statistique:
   a) Sur des déclarations des intéressés? Ces déclarations sont-elles contrôlées? De quelle manière? Fournit-on des formules à remplir?
   b) Sur des constatations officielles? Sur l'inspection des livres de bord ou d'autres documents analogues?
3) Sur quelles données s'étend la statistique?
   a) L'espèce des poissons? Le poids de la capture? Le classement d'après la taille? La valeur? (Comment la valeur est-elle déterminée?)
   b) Le lieu de la capture? Comment le lieu est-il indiqué? Par aires, par rectangles, ou autrement?
   c) Le genre de navires de pêche (à vapeur, à moteur, à voiles, etc.)?
   d) Méthodes de pêche (engins employés, etc.)?
   e) Durée du voyage, — durée du temps de pêche?

Comité Limnologique.

Président: le Prof. Henking.
Le Comité se réunit le 1 et le 7 Juin, 1928.

Le Comité prend note des communications suivantes:

1) Mr. Southern: Le Rapport du Dr. Redeke sur la pollution des rivières.
2) Le Prof. Järvi distribue son travail sur le Coregonus[1]) en Finlande, et expose les principaux résultats obtenus.

[1]) Järvi, T. H., 1928. Über die Arten und Formen der Coregonen s. str. in Finnland. Acta Zoologica Fennica 5, et Finlands Fiskerier (Suomen Kalatalous) 10.

3) Dr. Russell: "Furunculosis" in freshwater fishes in England and Scotland. The other members of the Committee gave information concerning the prevalence of this disease in their respective countries.
4) Prof. Henking: The races of salmon and trout. He demonstrated the material upon which he bases his results. He also discussed the laws and regulations governing their fisheries. He reported on the work of the various countries for 1927, the salmon hatcheries of Germany, and the convention between Switzerland, Germany and the Netherlands concerning the salmon fishery in the Rhine.
5) Dr. F. de Buen reported as follows concerning the Sub-Committee on Salmon: The Sub-Committee met at Vigo. Prof. Roule and Dr. F. de Buen visited the river Mino, the southern limit for the presence of salmon in Europe. The opinions held by the local experts were heard. Water samples were taken in order to determine the oxygen content, and at the same time the temperature was measured exactly in the boundary of the fresh water, where the influence of the sea does not reach.

The following recommendations were adopted by the Committee:—

I) That Professor Henking be asked to prepare the first part of his report (see Rapport et Procès-Verbaux Vol. XLV, p. 80) dealing with racial studies of salmon and trout for publication by the Council.
II) That the Sub-Committee appointed for the study of salmon in the area between Great Britain, Ireland, France and Spain be asked to continue its work and that Prof. Roule be re-elected as Chairman of the Sub-Committee.

Programme for the ensuing year.

1) The studies of the growth and life history of the salmonid fishes should be continued.
2) The racial studies of the salmonids should be continued.
3) Studies of the hybrids between various salmonid fishes should be carried out.
4) Marking experiments should be continued with the salmonid fishes.

Professor Henking was re-elected as Chairman for the ensuing year.

Editorial Committee.

Chairman: Prof. O. Pettersson.
The Committee met at 11,30 a. m. on June 6th, 1928.

With reference to the question of the cost of printing the Council's publications raised at the last meeting of the Council the following papers were considered:—

1) A Memorandum by Professor Pettersson.
2) A survey of the tenders received upon application from various countries.

3) Dr. Russell: La furonculose des poissons d'eau douce, en Angleterre et en Écosse. D'autres membres du Comité présentent des informations au sujet de l'extension de cette maladie dans leurs pays respectifs.
4) Le Prof. Henking: Les races du saumon et de la truite. Il montre le matériel sur lequel ses résultats sont basés. Il discute aussi les lois et règlements auxquels les pêcheries sont soumises. Il fait rapport sur le travail des divers Pays en 1927, sur les écloseries de saumon en Allemagne et sur la convention entre la Suisse, l'Allemagne et la Hollande au sujet de la pêcherie du saumon dans le Rhin.
5) Le Dr. F. de Buen fait le rapport suivant au sujet du Sous-Comité du Saumon: Le Sous-Comité s'est réuni à Vigo. Le Prof. Roule et le Dr. F. de Buen ont visité la rivière Mino, limite méridionale de la présence du saumon en Europe. Les opinions soutenues par les experts locaux ont été entendues. Des échantillons d eau ont été prélevés pour la détermination de la quantité d'oxygène, et, en même temps, la température a été exactement mesurée à la limite de l'eau douce, où l'influence de la mer ne se fait pas sentir.

Les recommandations suivantes sont adoptées par le Comité:

I) Que le Prof. Henking soit prié de préparer la première partie de son rapport (voir Rapports et Procès-Verbaux, Vol. XLV p. 81) — traitant de l'étude des races du saumon et de la truite, pour la publication par le Conseil.
II) Que le Sous-Comité nommé pour l'étude du saumon dans l'aire comprise entre la Grande Bretagne, l'Irlande, la France et l'Espagne, soit prié de poursuivre son travail et que le Prof. Roule soit réélu Président de ce Sous-Comité.

Programme pour l'année prochaine.

1) Les études sur la croissance et la biologie des poissons salmonides devraient être continuées.
2) L'étude des races des salmonides devrait être pursuivie.
3) Des études sur les hybrides entre divers poissons salmonides devraient être exécutées.
4) Les expériences de marquage sur les poissons salmonides devraient être continuées.

Le Prof. Henking est réélu Président pour l'année prochaine.

Comité Editorial.

Président: le Prof. Pettersson.
Le Comité se réunit à 11.30 a. m., le 6 Juin 1928.

Lors de la dernière assemblée du Comité où fut discutée la question concernant les frais d'impressions des publications du Conseil, on prit en considération les papiers suivants:

1) Un mémorandum du Professeur Pettersson.
2) Une estimation des propositions reçues, concernant les sollicitations de différents pays.

The following resolutions were adopted:—

I) That the Manuscript for the Rapport Atlantique for 1927 should be sent to both Bianco Luno and a printing firm in Paris, and that it should be printed where it was cheapest.

II) That Professor Pettersson's proposals concerning reduction of the printing costs be adopted in the form of the attached Appendix No. 1.

III) That Lectures and Discussions at the Scientific meetings should be printed as a "Rapport" in two separate volumes, one of which should contain the hydrographical and the other the biological material.

IV) That an index should be published as suggested in Professor Ehrenbaum's proposal (Appendix No. 2) embracing all the Council's publications of the 25 years up to 1927, and that a Committee consisting of Professors Ehrenbaum and Knudsen be nominated in order to discuss the details.

V) That Professor Gilson's paper on littoral fishing be published.

VI) That Professor Schmidt's papers about icelandic fishes, which had already been discussed in the Consultative Committee should be published as a scientific Area Report.

VII) That the proposal of Captain Grove (Appendix No. 3) concerning the Library be approved for one year with the substitution of Kr. 1.000 for Kr. 1.200 in numbered paragraph (4) and should be considered afresh next year.

APPENDIX No. 1

In order to reduce the printing costs of the Journal and Reports, etc. it is recommended:—

1) That all manuscripts be type-written, this, according to resolution No. 6 of the Editorial Committee, September 1926. (See Vol. XLI of Rapports et Procès-Verbaux, p. 98). The authors should prepare their diagrams in such a way that these do not require to be redrawn.

2) That graphic representations be made on white or light blue paper, under no conditions on yellow paper.

3) That paper No. 19 should, in general, be used, (this is the paper of the Journal).

4) That tables, when possible, should be printed without separating lines.

5) That the area of the printed text in the Rapports etc. should be increased from $13^1/_2 \times 18^1/_2$ cm. to $14^1/_4 \times 19^1/_2$ cm. This will involve a saving of 9 per cent. of the printing cost.

Copenhagen, 30th August 1927.

(signed) O. Pettersson.

/ E. Brönniche.

APPENDIX No. 2

The German Scientific Commission proposes that an alphabetical index to the contents of all the 46 volumes of the Rapports et Procès-Verbaux which have been issued

On adopta les résolutions suivantes:

I) d'envoyer le manuscrit du Rapport Atlantique de 1927 à Bianco Luno et à une imprimerie de Paris, et de faire imprimer là, où meilleur marché.

II) d'adopter sous la forme de l'appendice No. 1 ci-inclus, la proposition du Professeur Pettersson concernant la réduction des frais d'impression.

III) de faire imprimer les conférences et discussions faites aux réunions scientifiques comme "Rapport" en deux volumes séparés, l'un traitant la partie hydrographique, l'autre la biologique.

IV) de publier, selon la proposition du Professeur Ehrenbaum (Appendice No. 2), un index contenant toutes les publications du Conseil, comprenant les 25 dernières années jusqu'à 1927, et de nommer un Comité composé des Professeurs Ehrenbaum et Knudsen pour discuter les détails.

V) de faire publier le travail du Professeur Gilson traitant la pêche littorale.

VI) de faire publier, sous la forme d'un rapport scientifique de secteur, des travaux du Prof. Schmidt, ayant déjà été discutés dans le Comité consultatif, concernant les poissons islandais.

VII) d'approuver, pour une année, la proposition du Capitaine Grove (Appendice No. 3) concernant la librairie, de substituer la somme de Kr. 1.000 à Kr. 1.200 en paragraphe numeroté (4) et de les considérer de nouveaux l'année prochaine.

APPENDICE No. 1

Afin de diminuer les frais d'impression du Journal et des Rapports etc. il est recommandé:

1) que tous les manuscrits soient écrits avec le dactylotype selon la décision No. 6 du Comité éditorial, Septembre 1926. (Voir le Volume XLI des Rapports et Procès-Verbaux, p. 99). Les auteurs sont priés de préparer leurs diagrammes de telle manière qu'ils n'ont pas besoin d'être redessinés.
2) que les dessins graphiques soient faits sur du papier blanc ou bleu clair, en aucun cas sur du papier jaune.
3) d'employer, en général, le papier No. 19 (qui est le papier du Journal).
4) de faire imprimer, si possible, les tables sans lignes intermédiaires.
5) d'augmenter la place du texte imprimé dans les Rapports etc. de $13^1/_2 \times 18^1/_2$ cm. à $14^1/_4 \times 19^1/_2$ cm. Ce qui diminuera les frais d'impression de 9 %.

Copenhague, le 30 Août 1927.

(signé) O. Pettersson.

/ E. Brönniche.

APPENDICE No. 2

La Commission Scientifique Allemande propose de faire compiler et imprimer un index alphabétique pour le contenu de tous les 46 volumes des Rapports et Procès-

up to the present time and of all the 91 numbers of the Publications de Circonstance shall be compiled and printed.

The reasons for this proposal are as follows:—

A large and it may be said the most important part of the work which has been done by the International Council for the Exploration of the Sea is recorded in the Rapports et Procès-Verbaux and a no small portion of the funds expended is used for the printing and suitable production of these works.

In the course of a long series of years the amount of subject-matter accumulated in these publications has, however, become so large that scarcely anyone connected with the work of the International Council can be so acquainted with the contents of the publications as to be capable of finding any required contribution easily and quickly, especially as the personnel has undergone many changes in the course of years.

Since, however, it is of the greatest importance that the valuable contents of the publications should be easily and quickly accessible both to those who are at any time connected with the work and to future generations, it is urgently necessary that as complete an index as possible of the total contents be compiled, even if it entails considerable expenditure.

Professor Ehrenbaum has sent Professor O. Pettersson, as representing the Editorial Committee, a draft of a proposal as to the manner in which the compilation of the alphabetical index should be carried into effect.

APPENDIX No. 3

The Library of the Council.

When the Council was founded in 1902 publications regarding fishery were acquired, both by gift and purchase, especially publications of the countries bordering on the North Sea and the Baltic.

The library of the Council has, however, been extended chiefly through the exchange of periodicals from the participating countries, but other countries have also helped towards the formation of the library through an exchange of their reports and periodicals.

At present, the Council receives 200 periodicals, dealing with Biology, Hydrography, Meteorology, Statistics and Geography, and the library now contains about 3500 volumes which are shelved in the rooms of the Council's Head-Office or, for want of shelves or book-cases, stored in the loft.

The books are catalogued according to the card index system.

Up to the present, means have not been available to have the books bound, the 200 crowns granted having sufficed only to have the most important publications bound; the others, three quarters of the library, are unbound and thereby exposed to destruction and are not easily accessible.

In order to preserve the library the importance of which is growing and which now contains several works of value, it would be desirable that the Council augmented the budgeted amount and I therefore beg to propose as follows:—

Verbaux existant jusqu'à maintenant et de tous les 91 numéros des Publications de Circonstance.

Les raisons de cette proposition sont les suivantes:

La plus grande partie, et, on peut dire, la partie la plus importante du travail fait par le Conseil International pour l'Exploration de la Mer est conservée dans les Rapports et Procès-Verbaux et une assez grande partie des fonds dépensés a été employée pour l'impression et pour la reproduction convenable de ces ouvrages.

Au cours d'une longue série d'années, la quantité des sujets accumulés dans ces publications a augmenté d'une telle manière qu'il est impossible, même à une personne très au courant du contenu de ces publications, de trouver facilement et rapidement un article réclamé, surtout que le personnel a subi plusieurs changements pendant le courant des années.

Cependant, il est de la plus grande importance, pour rendre accessible facilement et promptement soit à ceux qui sont habituellement en rapport avec la publication, soit à la génération future, il est même une nécessité urgente de compiler le contenu total afin d'obtenir un index aussi complet que possible, même si cette opération exige des frais considérables.

Le Professeur Ehrenbaum a envoyé au Prof. Pettersson qui représente le Comité éditorial, un tracé du projet traitant la manière de procéder pour la compilation de l'index alphabétique.

APPENDICE No. 3

La Bibliothèque du Conseil.

Au temps de la fondation du Conseil en 1902, on acquit, soit par don soit par achat, des ouvrages concernant la pêche, et surtout des ouvrages des Pays voisins de la Mer du Nord et de la Baltique.

Cependant la bibliothèque du Conseil s'est principalement formée par l'échange de périodiques provenant des Pays participants, mais aussi de beaucoup d'autres Pays qui ont demandé les publications du Conseil en échange de leurs rapports et de leurs périodiques.

A l'heure actuelle le Conseil reçoit 200 périodiques traitant la Biologie, l'Hydrographie, la Météorologie, la Statistique et la Géographie, et la bibliothèque contient actuellement env. 3500 volumes placés dans les locaux du Conseil ou emmagasinés au grenier faute de rayons ou d'armoires.

Les livres sont catalogués par fiches.

Jusqu'à présent on n'a pas eu les moyens pour les faire relier, la somme accordée, 200 couronnes, n'a suffi qu'à faire relier les ouvrages les plus importants; mais tout le reste, les trois quarts de la bibliothèque, ne sont pas reliés et par cela même exposés à être détruits et ne sont pas facilement accessibles.

Pour conserver la bibliothèque dont l'importance est croissante et qui contient plusieurs oeuvres de valeur, il serait désirable que le Conseil augmentât la somme accordée, et dans ce sens je me permets de proposer:

1) that the series where only some copies are wanting be completed,
2) that shelves or cases be bought for the books now stored in the loft,
3) that the periodicals be bound in plain covers,
4) that the yearly amount of Kr. 200 be augmented to 1200 for a period of 5 years.

(signed) P. Grove.

Whaling Committee.

Chairman: Professor Johan Hjort.

The Committee met at 10 a. m. on June 1st and at 2.30 p. m. on June 2nd, 1928.

The Chairman referred to the protocol of the meeting of the Whaling Committee at Paris, especially p. 29. He then informed the Committee that he had been in London where he had conferred with the members of the Discovery Committee, including its Chairman, Mr. Darnley of the Colonial Office, Mr. Borley, and with Dr. Kemp, the Director of the Committee's investigations, concerning the most important matters for consideration in connection with the proper regulation of the whaling industry, in accordance with the problems discussed at Paris. On his return to Norway he had found that the question had been the subject of a discussion there also, which had resulted in the preparation by the Norwegian Department for Trade and Fisheries of the draft Bill attached hereto[1]). The principal idea of this draft, he stated, was to extend the regulations in force in the Falkland Island Dependencies to pelagic whalers, who up to the present time had been free from restrictions. Section 4 of the Bill was only intended as a basis to give the Government powers to prohibit the capture of whales, and did not impose any obligations on the Government to do so. He did not propose to enter into details of this Bill, but only asked the members to lay it before their own Departments for discussion, and to consider it as a first step towards the general regulation of whaling, in respect of both pelagic whalers and those already licensed. If this scheme of regulation by national action should prove unsatisfactory international action might be considered

The discussion resulted in the following resolution:—

I) "The Whaling Committee has read with great interest the draft Bill communicated to it by the Norwegian Government, and desires to express its appreciation of the initiative taken by that Government. The Committee considers that criticism of the draft in detail is outside its terms of reference; but welcomes the proposal of the Norwegian Government to apply to pelagic whaling vessels under its control regulations similar to those enforced in particular in the Falkland Islands and their Dependencies with regard to licensed whaling factories on shore and afloat.

With reference to Section 4 of the draft the Committee suggests that further discussion of the relevant facts is necessary before rational regulations of whaling in tropical and subtropical areas could be formulated."

[1]) Appendix No. 1.

1) de compléter les oeuvres où il ne manque que peu d'exemplaires,
2) d'acheter des rayons ou des armoires pour y mettre les livres emmagasinés au grenier,
3) de faire relier les périodiques dans des reliures simples,
4) d'augmenter la somme annuelle de 200 couronnes à 1200 couronnes pour une période de 5 ans.

(signé) P. Grove.

Comité de la Baleine.

Président: le Prof. Johan Hjort.

Le Comité s'est réuni le 1 Juin à 10 h. a. m. et le 2 Juin à 2.30 p. m., en 1928.

Le Président rappelle le protocole de la réunion du Comité de la Baleine à Paris, et spécialement sa p. 29. Il fait connaître au Comité qu'il a conféré, à Londres, avec les membres du Comité du "Discovery", y compris son Président Mr. Darnley, du Colonial Office, Mr. Borley et le Dr. Kemp, Directeur des investigations du Comité, — au sujet des principales questions à considérer en vue de la bonne réglementation de l'industrie baleinière, et sans perdre de vue les problèmes discutés à Paris. A son retour en Norvège, il a trouvé que, là aussi, la question avait fait l'objet d'une discussion qui avait eu pour résultat la préparation, par le Ministère du Commerce et des Pêcheries, du projet de loi ci-annexé[1]). L'idée principale de ce projet est d'étendre les réglementations en vigueur dans les "Falkland Island Dependencies", aux baleiniers pélagiques qui, jusqu' ici, ont été exempts de toute restriction. La section 4 du projet n'est destinée qu'à fournir une base donnant au Gouvernement des pouvoirs pour prohiber la capture des baleines, sans lui en imposer l'obligation. Le Président ne se propose pas d'entrer dans les détails de ce projet; il demande simplement aux membres de le soumettre à la discussion dans leurs Départements respectifs et de le considérer comme un premier pas vers la réglementation générale de l'industrie baleinière applicable tant aux baleiniers pélagiques qu'à ceux qui sont déjà soumis à une licence. Si ce projet de réglementation par action nationale se révèle insuffisant, on pourra envisager une action internationale.

La discussion aboutit à la résolution suivante:

I) "Le Comité de la Baleine a pris connaissance avec grand intérêt du projet de loi qui lui a été communiqué par le Gouvernement Norvégien et tient à exprimer qu'il apprécie hautement l'initiative prise par ce Gouvernement: le Comité considère que l'examen détaillé de ce projet de loi sort des limites de sa compétence toutefois il est absolument favorable à la proposition du Gouvernement Norvégien d'appliquer aux "baleiniers pélagiques" placés sous son contrôle, une réglementation analogue à celle actuellement en vigueur dans les concessions et usines flottantes ou construites sur le littoral dans la région des îles Falkland et Dépendances.

En ce qui concerne l'article 4 du projet de loi, le Comité considère qu'il y aurait lieu de discuter d'une façon plus approfondée la question visée par cet article, avant d'établir une réglementation rationelle de la chasse aux baleines dans les régions tropicales et subtropicales."

[1]) Appendice No. 1.

Dr. LE DANOIS proposed an additional meeting before the next meeting of the Council, and Mr. MAURICE laid a memorandum[1]) before the Committee for their consideration.

The Committee passed the following resolution:—

II) "The Committee recommends that the Bureau be asked to ascertain from the Governments concerned the opinions of their respective Colonies and Dependencies and in the case of the British Empire the Dominions with reference to certain material points referred to in Paragraph 2 (c) below which have arisen in the discussion of the Committee with regard especially to whaling in tropical and sub-tropical waters and that if and when the information is available they should arrange for a meeting at a date and place convenient for the Committee."

On consideration of Mr. MAURICE's memorandum the Committee made the following observations:—

Point 1) "The Committee recognises the importance of this suggestion but does not feel able to make a definite recommendation at the present meeting. It will take the question into further consideration at its next meeting, and considers it desirable that in the interval, the Governments concerned should be consulted as to whether in their opinion any measure of this character is practicable in the area in which they are interested.

Point 2) a) The Committee is in agreement with this principle, which is already enforced in most areas, and should be extended to any areas where it is not already in force.

b) The Committee agrees that regulations are desirable to prevent the destruction of whales in poor condition, but finds it difficult to express an opinion as to how any regulation for this purpose should be framed or enforced. It suggests therefore an enquiry as to whether any particular areas can be designated as those in which the general condition of whales is so poor that fishing is in fact wasteful and uneconomic. An enquiry as to the oil production per whale of the various species in different areas would be invaluable in this connection.

c) The Committee is in general agreement with the principle that protection should be accorded to certain species which have been greatly reduced, but, considers that with regard especially to the Humpback Whale which, in certain zones is abundant or is the principal object of pursuit, and the Sperm Whale, which is not now greatly sought after, further information should be sought through the Governments concerned."

The Chairman emphasised the vital importance which statistics possess for the elucidation of whaling problems, and asked the members to press for the collection of such statistics, informing the Committee that the Economic Committee of the League of Nations was willing to give their assistance.

Mr. RISTING laid before the Committee a statistical report which is appended hereto[2]).

The Chairman was re-elected for the ensuing year.

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[1]) Appendix No. 2.

[2]) Appendix No. 3.

Le Dr. LE DANOIS propose une nouvelle réunion avant l'Assemblée prochaine du Conseil, et Mr. MAURICE soumet un mémorandum[1]) à l'examen du Comité.

Le Comité adopte la résolution suivante:

II) "Le Comité recommande que le Bureau soit prié de s'enquérir auprès des Gouvernements intéressés, de l'avis de leurs Colonies et Dépendances respectives, et, — dans le cas de l'Empire Britannique, — des Dominions, au sujet de certains points importants touchés au Paragraphe 2(c), qui ont surgi au cours de la discussion, particulièrement au sujet de la chasse aux baleines dans les eaux tropicales et subtropicales. Le Bureau pourrait arranger une réunion, à une date et en un lieu convenant au Comité, après l'obtention de ces informations."

Après examen du Mémorandum de Mr. MAURICE, le Comité présente les remarques suivantes:

Point 1) "Le Comité reconnaît l'importance de cette suggestion, mais il ne se juge pas en mesure, dans la présente réunion, de formuler une recommandation définie. Il reprendra la question en plus ample considération dans sa prochaine réunion, et il croit désirable qu'entretemps les Gouvernements intéressés soient consultés sur le point de savoir si, dans leur opinion, une mesure de ce caractère serait praticable dans l'aire qui les concerne.

Point 2) a) Le Comité est d'accord avec ce principe, qui est déjà appliqué dans beaucoup de régions, et qui devrait être étendu à toutes les aires où il ne l'est pas encore.

b) Le Comité admet qu'il est désirable qu'une réglementation prévienne la destruction des baleines en condition maigre, mais il éprouve de la difficulté à indiquer la manière de formuler une réglementation et de la sanction à lui donner. Il propose donc que l'on fasse une enquête pour rechercher si l'on peut désigner certaines aires comme des régions dans lesquelles la condition générale des baleines est si mauvaise que leur capture y est réellement un gaspillage antiéconomique. Une enquête sur la production d'huile par baleine, pour différentes espèces et pour diverses régions serait précieuse, sous ce rapport.

c) Le Comité est d'accord, en général, avec le principe qu'une protection doit être accordée à certaines espèces qui sont fortement réduites, mais il pense que pour le Humpback qui est abondant dans certaines zones ou y constitue le principal objet de la chasse, et pour le Cachalot qui, aujourd'hui, n'est plus très recherché, il faudrait demander de nouvelles informations par l'intermédiaire des Gouvernements intéressés."

Le Président insiste sur la grande importance des statistiques pour l'élucidation des problèmes baleiniers, et demande aux membres d'accélérer la réunion de ces statistiques. Il fait connaître au Comité que le Comité économique de la Société des Nations est disposé à lui donner assistance.

Mr. RISTING présente au Comité le rapport statistique qui est donné ci-dessous, en Appendice[2]).

Le Président est réélu pour l'année prochaine.

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[1]) Appendice No. 2.

[2]) Appendice No. 3.

APPENDIX No. 1

To the Members
of the Whaling Committe,
of the Consultative Committee and
of the Bureau.

Sirs,

At the meeting of the International Whaling Committee in Paris last year a number of questions for the regulation of the Whaling Industry were discussed. Since then the question of formulating such regulations has been under consideration in different countries. At the beginning of this year the Association of Norwegian Whalers appointed a committee for the drafting of regulations for all Norwegian whalers. In the Norwegian Department for Trade and Fisheries the enclosed draft has been under consideration for some time, but owing to the want of time it has not yet been discussed by the Whaling Association, the higher authorities of the Ministry nor by the Government. The Minister for the Department has, however, wished the draft to be laid before the International Whaling Committee under the definite understanding that the document is to be considered as a draft for discussion only.

On circulating this draft I beg for my own part to say that I have not yet had an opportunity to investigate all the details, but that I should very much like to have the views of the Committee with regard to the two questions:—

1) Whether the Committee by their recommendation would support the initiative, in general, taken by the Norwegian Department.
2) Whether the Committee would like to forward any remarks on the special regulations suggested, especially those which have a bearing on the scientific side of the case.

I am, Sirs, Your obedient Servant

(signed) Johan Hjort.

BILL

concerning the capture of Baleen Whales.

§ 1.

The provisions of this Bill concern the capture of Baleen whales, *Balaenoptera acutorostrata* excepted, carried on by Norwegian firms or companies or from Norwegian floating factories.

§ 2.

Any person who intends to carry on such fishing must report to the competent Government Ministry. Such notification must contain the information prescribed by the competent Ministry.

APPENDICE No. 1

Aux Membres
du Comité de la Baleine,
du Comité Consultatif et
du Bureau.

Messieurs,

A la réunion du Comité international de la Baleine, à Paris, on a discuté, l'année passée, un certain nombre de questions ayant trait à la réglementation de l'industrie baleinière. Depuis lors, la question de la forme à donner à cette réglementation a été prise en considération dans différents Pays. Au commencement de cette année, l'Association des Baleiniers de Norvège a nommé un Comité pour la préparation de règlements applicables à tous les baleiniers Norvégiens. Le projet ci-inclus a été pris en considération pendant quelque temps par le Ministère Norvégien du Commerce et des Pêcheries, mais, par suite du manque de temps, il n'a pas encore été discuté par l'Association Baleinière, ni par les Autorités du Ministère, ni par le Gouvernement. Cependant, le Ministre du Département a exprimé le désir de le voir soumis au Comité international de la Baleine, mais il doit être entendu que ce document ne doit être considéré que comme un projet destiné à la discussion.

En distribuant ce projet, je me permets de dire que, pour ma part, je n'ai pas encore eu l'occasion d'en examiner tous les détails, mais que je serais heureux de connaître les vues du Comité au sujet de deux questions:

1) Si le Comité accorderait l'appui de sa recommandation, en général, à l'initiative prise par le Ministère Norvégien.
2) Si le Comité désire présenter des remarques au sujet des règles proposées, et spécialement au sujet de celles qui ont des rapports avec le côté scientifique des problèmes.

Je suis, Messieurs, Votre obéissant Serviteur.

(signé) Johan Hjort.

PROJET

de Convention concernant la capture des baleines.

§ 1.

Les dispositions de cette loi concernent la capture des baleines, excepté les *balaenoptera acutorostrata*, par des firmes ou des sociétés norvégiennes ou par des bateaux-usines norvégiens.

§ 2.

Toute personne désirant s'occuper de cette pêche doit s'adresser au Ministère compétent du Gouvernement. Cette notification doit contenir les informations prescrites par le Gouvernement en question.

§ 3.

The capture of right whales is prohibited. It is also prohibited to shoot young sucking whales or females which are accompanied by sucklings.

§ 4.

The Crown can prohibit the capture of whales in tropical and sub-tropical waters.

§ 5.

Of the carcase of every whale which it is intended to use for the production of oil there should be boiled at least all blubber, the head and the tongue, and also the tail up to the outer opening of the larger intestine (anus).

The person who is responsible for the operations (the manager) shall be responsible in accordance with § 10 of this Law to ensure that the catch is not carried on with greater intensity than the factory can treat all the carcases of whales brought in as prescribed above.

It is also incumbent upon him to endeavour to utilise all raw materials in the most effective manner.

§ 6.

Every whaling boat, every floating factory and every land station must be equipped with apparatus for wireless telegraphy or telephony and have the necessary attendants for the same. The Crown can give dispensation from this clause.

Furthermore every floating factory and every land station must be equipped with the necessary arrangements for cooking, not only blubber, but also flesh and bones, (compare first paragraph of § 5). Further regulations concerning this can be issued by the competent Department.

§ 7.

Gunners and crews on whaling boats must be hired in such a way that the remuneration for their work in the whaling fields is not exclusively dependent upon the number of whales shot.

A copy of the hiring contract shall be submitted to the competent Government Department.

§ 8.

All whales captured in accordance with this Law may be subjected by the Crown to a duty of not more than 20 öre per barrel (170 kilogrammes) of oil produced. This duty shall be devoted to scientific investigation of interest to Norwegian whaling in accordance with the further determinations of the competent Department, and to defray the expenses connected with the control of the observance of this Law.

§ 9.

The Crown can issue further regulations for the control of the observance of this Law and compel the firms and companies mentioned in paragraph 1 and also the owners of the floating factories mentioned in the same paragraph to have the floating factory subjected to public control.

§ 3.

La capture des baleines franches est interdite. Il est aussi interdit de tuer les petits ou les femelles accompagnées de jeunes qu'elles allaitent.

§ 4.

Le Roi peut interdire la capture des baleines dans les mers tropicales et subtropicales.

§ 5.

De toute carcasse de baleine destinée à la protection de l'huile, il faut bouillir au moins tout le lard, la tête et la langue, ainsi que la queue jusqu'à l'orifice de l'anus.

Le capitaine responsable des opérations est, selon le § 10 de cette convention, obligé d'observer que la capture des baleines ne soit pas pratiquée sur une plus grande échelle que ne le permet la possibilité de traiter selon la prescription ci-dessus toutes les carcasses des baleines capturées.

Il lui incombe aussi d'essayer d'utiliser toutes les matières de la manière la plus effective possible.

§ 6.

Tout bateau-chasseur, tout bateau-usine et toute station maritime doivent être pourvus d'appareils de télégraphie sans fil ou de téléphone avec le personnel nécessaire. Le Roi peut donner dispense de cette clause.

De plus, toute usine flottante et toute station maritime doivent être pourvues de l'agencement nécessaire pour le traitement non-seulement du lard, mais aussi de la viande et des os, (comparez la première partie du paragraphe 5). D'autres règlements concernant ce sujet peuvent être déterminés par le Département compétent.

§ 7.

Les chasseurs et l'équipage des baleiniers ne doivent pas être recrutés de telle sorte que la rémunération de leur travail est exclusivement dépendante du nombre de baleines tuées.

Une copie du contrat d'engagement doit être soumise au Département compétent du Gouvernement.

§ 8.

Toutes les baleines capturées selon cette convention sont soumises par le Roi à une taxe d'au plus 20 øres par fût d'huile (170 kilos). Cette taxe doit, selon une détermination plus détaillée du Département compétent, être consacrée à des recherches scientifiques intéressant la chasse aux baleines norvégienne, et défrayer les frais occasionnés par le contrôle pour l'observation de cette convention.

§ 9.

Le Roi peut promulguer d'autres règlements pour le contrôle de l'observation de cette convention et entre autres obliger les firmes et les sociétés mentionnées dans le paragraph 1, ainsi que les propriétaires des bateaux-usines mentionnés dans le même paragraphe, à soumettre les bateaux-usines à un contrôle public.

§ 10.

Breach of this Law or of regulations issued in conformity therewith is punishable by a term of imprisonment not exceeding .....

Remarks

to a Bill concerning the capture of Baleen Whales.

Re § 1. As is known the largest capture of Baleen whales by Norwegians takes place in the Southern Seas, and the Law thus aims at regulating these activities; but the Law will also apply to whaling off the Norwegian coast and e. g. off Svalbard. As the bottle nose is a toothed whale, the capture of this species will not come under the Law. The same applies to the Sperm whale the capture of the latter, howewer, is of immaterial importance. The Baleen Whales which have the greatest interest for Norwegian Industry are the Blue whale, the Fin whale, the Humpback and the Sei whale.

As this paragraph is worded, those companies also which have concessions will come under the Law, provided they are Norwegian Companies or operate from Norwegian floating factories. By the term "floating factories" is meant not only floating factories which with hauling slips etc. are specially adapted to what is known as pelagic whaling, but any ship which prepares the carcases of whales.

Re § 2. This clause is necessary with regard to control and to give a general survey of the work.

Re § 3. The Right whale class comprises both the North Cape Whale, the Greenland whale and the South Cape whale. There appear to be several species of South Cape whales. Most British concessions contain a prohibition against the capture of Right whales. The same applies to suckling whales, and females which are accompanied by sucklings. By this clause pelagic whaling will thus experience the same restrictions as those enforced in ordinary concessions.

Re § 4. The capture of whales in tropical and sub-tropical regions is not rational from an economic point of view, since, as a rule, such whales are very thin. It is doubtless a very widespread opinion amongst whaling people that such operations should cease. Nevertheless it may be a too radical step to enforce total prohibition.

Re § 5. Strong criticisms have been made regarding the poor utilisation of raw material in Norwegian whaling. This is partly due to the special nature of the industry, and it is clear that we must be very careful in interfering. The demands, however, made in this paragraph would not appear to be more rigorous than could be realised.

Re § 6. If a whaling manager is to be able to see that whaling is not conducted more rapidly than the factory can utilise the carcases as prescribed in paragraph 5, the whaling ships, in addition to the factory and the land station, must be equipped with

§ 10.

Une contravention à cette convention ou aux règlements promulgués en conformité avec celle-ci, est punissable d'emprisonnement jusqu'à .....

Remarques

pour un projet de loi concernant la chasse aux baleines.

§ 1. Comme on le sait, les Norvégiens ont leurs plus grandes chasses aux baleines dans les mers du Sud et c'est donc cette chasse que la loi vise tout spécialement. Mais la convention compte aussi pour la chasse aux côtes de la Norvège et par exemple au sud de Svalbard. La "bottle nose" (*hyperoodon diodon*) étant une baleine à dents, sa capture ne tombe pas sous cette loi. Il en est de même des cachalots, mais la capture de ces dernières est de peu d'importance. Les baleines qui intéressent le plus l'industrie norvégienne sont les baleines bleues, les baleinoptères, les Humpbacks et les *balaenopteri borealis*.

D'après la conception de ce paragraphe, les sociétés qui ont des concessions tombent aussi sous la loi si ce sont des sociétés norvégiennes ou exploitant des bateaux-usines norvégiens. Le terme "bateau-usine" ne comprend pas seulement les bateaux aménagés avec des chaînes de halage, etc., et spécialement adaptés pour ce que l'on appelle la chasse pélagique aux baleines, mais n'importe quel bateau s'occupant de la préparation des carcasses de baleines.

§ 2. Cette clause est nécessaire pour le contrôle et la surveillance générale des travaux.

§ 3. La classe des baleines franches comprend les baleines du Cap Nord, du Groenland et du Cap Sud. Il semble qu'il y a plusieurs espèces de baleines du Cap Sud. La plupart des concessions britanniques contiennent une interdiction contre la capture des baleines franches. Cette interdiction s'applique aussi aux baleineaux et aux femelles accompagnées de petits qu'elles allaitent. Par cette clause, la chasse pélagique est soumise aux mêmes restrictions que celles des concessions ordinaires.

§ 4. La capture des baleines dans les régions tropicales et subtropicales n'est pas profitable au point de vue économique, les baleines y étant, en général, très maigres. C'est une opinion certainement très répandue parmi les baleiniers que cette chasse devrait cesser. Cependant il serait trop radical de procéder à une prohibition complète.

§ 5. Il a été beaucoup critiqué que les industriels norvégiens n'utilisaient pas tout le matériel. Ceci est dû en partie à la nature spéciale de l'industrie, et il est clair qu'on ne doit intervenir qu'avec prudence, mais les demandes formulées par le paragraphe ne semblent pas être trop rigoureuses pour qu'on ne puisse en exiger la réalisation.

§ 6. Pour que le capitaine d'un bateau chasseur soit en état de juger si la pêche n'est pas faite plus rapidement que ne le permet le traitement des carcasses au bateau-usine selon le paragraphe 5, le bateau-chasseur doit, comme le bateau-usine et la station

wireless telegraphy and telephony. But it will be necessary to give some dispensations from this, e. g. for whaling off the Norwegian coast.

Re § 7. This clause aims at a departure from the arrangement by which the crew of a whaler, and especially the gunners are only interested in shooting as many whales as possible. By this method of pay they were not interested in the best possible utilisation of all raw materials nor were they specially interested in shooting the largest and fattest whale.

Re § 8. The difficulties of an international character which now face Norwegian whaling make it necessary for us to take up a planned scientific study of the whale and its occurrence. This will be in the interests of the industry itself, and it does not appear to be unreasonable that means should be procured by levying a small duty. The control of the Law will also demand expenditure. Thus undoubtedly it will be necessary for every large floating factory to have a controlling agent on board. These controllers at the same time could be employed in the service of scientific investigation. A duty of 20 öre per barrel of oil would not appear to be specially alarming, for we can well assume that a barrel of oil will have a value of Kr. 80.

APPENDIX No. 2

Memorandum

of Suggestions for the Protection of the Whaling Industry, on which the President would like to have the opinion of the Whaling Committee.

From various discussions of the whaling question which I have attended, it is clear to me that there is widely felt apprehension that the stock of whales may fall below the level which would ensure the continuation of the present prosperity of the whaling industry, and, having regard to modern developments in whaling in the southern hemisphere and to the history of whaling generally, this apprehension may prove to be justified.

Past history has clearly shown that once a stock of whales is seriously diminished, recovery, if possible at all, is exceedingly slow, and I understand that recent investigations indicate that, though the growth of whales is at first rapid, and maturity is reached early, the adults breed not more often than once in every alternate year. Scientific research is not as yet sufficiently advanced to afford a basis for the rational exploitation of the stock of whales, but every indication drawn either from past history or modern work suggests the necessity for precaution against wasteful exploitation of the stock. I, therefore, invite the Committee to consider the following suggestions:—

1) Pending the result of investigations now in progress, might it not reasonably be suggested that all Governments should agree not to allow for a definite period — say 5 years, any increase of whaling, at least in any of the areas where whaling is now carried on? There may be difficulties about making such an agreement effective, but it should not, I think, be difficult to secure an agreement in principle, since appre-

maritime, être pourvu de la télégraphie sans fil et du téléphone. Pourtant, il est nécessaire de donner des dispenses de cette clause, par exemple pour la chasse le long des côtes de la Norvège.

§ 7. Cette disposition vise à se départir de l'arrangement suivant lequel l'équipage et surtout les chasseurs d'un baleinier sont intéressés à tuer autant de baleines que possible. Par ce mode de payement, les hommes ne sont pas intéressés à utiliser le mieux possible le matériel et n'ont non plus pas un intérêt spécial à chercher à tuer les baleines les plus grandes et les plus grasses.

§ 8. Les difficultés de caractère international qui se présentent maintenant pour la chasse aux baleines de la Norvège nous obligent à entreprendre une étude réglée et scientifique de la baleine et de ce qui s'y rattache. Ceci est dans l'intérêt même de l'industrie et il ne semble pas déraisonnable de s'en procurer les moyens en levant un petit impôt. Le contrôle de la convention amène aussi des frais. Il sera ainsi certainement nécessaire que tout grand bateau-usine ait à bord un agent de contrôle. Ces contrôleurs pourront aussi être employés au service des recherches scientifiques. Une taxe de 20 øres par fût d'huile ne semble pas trop rigoureuse, car on peut bien supposer qu'un fût d'huile a une valeur de 80 couronnes.

APPENDICE No. 2

Mémorandum

des Propositions pour la Protection de l'Industrie Baleinière, au sujet desquelles le Président voudrait connaître l'avis du Comité de la Baleine.

A la suite de diverses discussions sur la question baleinière, auxquelles j'ai assisté, il m'apparaît clairement qu'il existe une appréhension très répandue de voir le stock des baleines tomber en dessous du niveau auquel le maintien de la prospérité actuelle de la chasse aux baleines peut être assuré et, si l'on tient compte du développement moderne de cette industrie dans l'hémisphère Sud, et de son histoire en général, cette appréhension paraît justifiée.

L'histoire du passé montre clairement qu'une fois un stock de baleines sérieusement réduit, sa reconstitution, si elle est possible, est extrêmement lente, et je crois saisir que les investigations récentes indiquent que, si la croissance des baleines est rapide au début, et si la maturité est atteinte de bonne heure, d'autre part l'adulte ne se reproduit que tous les deux ans. La recherche scientifique n'est pas encore assez avancée pour fournir une base à l'exploitation rationelle du stock des baleines, mais toutes les indications tirées soit de l'histoire du passé, soit du travail moderne, attestent la nécessité de mesures contre l'exploitation prodigue du stock. C'est pourquoi j'invite le Comité à prendre en considération les suggestions suivantes:

1) Dans l'attente des résultats des investigations en cours, ne serait-il pas raisonnable de proposer que tous les Gouvernements se mettent d'accord pour ne plus permettre, pendant une période limitée, 5 ans par exemple, aucun accroissement de l'industrie baleinière, au moins dans les parages où cette industrie s'exerce aujourd'hui? L'application effective d'un engagement de ce genre peut rencontrer des difficultés, mais

hension as to the effect upon the stock of the present exploitation of whales appears to be practically universal, and investigation of this question would obviously be facilitated if during the period of investigation there were no material extension of whaling operations in the present whaling areas.

2) Might it not be agreed generally that protection should be given:—
   a) To young and immature whales. It appears to me to be practically self-evident that the hunting of any whale calf or female while accompanied by a calf should be prohibited. I have heard it suggested also that immature whales (the calves of the previous year) might be protected by an arrangement whereby the bonus paid to a gunner for such a whale is substantially less than that paid for one of average or large size.
   b) As far as possible, to whales in poor condition. I understand that the Blue and Fin whales taken in certain areas are for the most part small and immature, or, if large, in poor condition, that the yield of oil from these whales is exceedingly low, and that great numbers must be taken in order that operations shall be commercially successful. This appears to be borne out by the statistics of Risting recently published; and
   c) To species of whales which have been greatly reduced in numbers. The species which, I understand, call for immediate and complete protection are specially the Nordkaper, the Greenland Right whale and the Southern Right whale. The taking of the last-named is already prohibited by regulation in the area of the Falkland Islands' Dependencies. I gather that the Sperm whale, the Pacific Grey whale and the Humpback also call for some measure of protection.

   With reference to both a), b) and c) practical difficulties may arise, but, while I recognise the difficulty of interfering with vested interests, I consider it important to enunciate the broad principle that wasteful exploitation of the stock should in any case be avoided.
3) Governments might be invited to agree to insist so far as possible on the observance of the principle that carcases of whales should be utilised as completely as possible in order to secure the utmost economy in the industry.

18th May, 1928.

(signed) Henry G. Maurice.

APPENDIX No. 3

With reference to Mr. Maurice's memorandum submitted to the Whaling Committee I would remark as follows:—

re. 2. a. Undoubtedly it would be an advantage for the preservation of the stock of whales if the young and immature whales could be protected completely. In the regulations for the Falkland Island Dependencies therefore it is already prohibited to shoot females accompanied by calves. This is also the case off

il ne me paraît pas difficile d'obtenir un accord de principe, puisque l'appréhension des effets de l'exploitation actuelle sur le stock des baleines est pratiquement universelle et qu'il est évident que l'investigation serait facilitée si, pendant la période de recherche, il ne se produisait aucune extension importante des opérations baleinières dans les parages baleiniers actuels.

2) Ne pourrait-on pas convenir qu'en général une protection doit être accordée:

a) aux baleines jeunes et immatures. Il me paraît évident que la chasse d'une baleine jeune ou d'une femelle accompagnée de son jeune devrait être prohibée. J'ai aussi entendu suggérer que les baleines immatures, (les jeunes de l'année précédente), pourraient être protégées par un arrangement d'après lequel la prime payée au canonnier pour une baleine de cette catégorie serait notablement inférieure à celle qui est payée pour une baleine de taille moyenne ou de grande taille.

b) autant que possible, aux baleines en condition maigre. Je pense que la baleine bleue et le baleinoptère capturés dans certaines régions sont, pour la plupart, de petite taille et immatures ou en condition maigre, si leur taille est forte, que le rendement en huile de ces baleines est extrêmement faible, et qu'il faut en capturer de grands nombres pour que les opérations soient commercialement profitables. Ceci semble ressortir des statistiques récemment publiées par Risting.

c) aux espèces de baleines dont le nombre est déjà fortement réduit. Les espèces qui réclament une protection immédiate et complète sont spécialement, je crois, la baleine du Cap Nord, la baleine franche du Groenland et la baleine franche du Sud. La capture de cette dernière est déjà défendue par un règlement dans les "Falkland Islands Dependencies". J'apprends que le cachalot, la baleine grise du Pacifique et le Humpback demandent aussi des mesures de protection.

Des difficultés pratiques peuvent surgir au sujet des trois points a), b) et c), mais, tout en reconnaissant qu'il est difficile d'intervenir dans des intérêts engagés, je considère comme important d'énoncer le principe général que l'exploitation prodigue du stock doit, en tout cas, être évitée.

3) Les Gouvernements pourraient être invités à s'entendre autant que possible sur le principe que les cadavres de baleines doivent être utilisés aussi complètement que possible afin de garantir à l'industrie la plus extrême économie.

18 Mai, 1928.

(signé) Henry G. Maurice.

APPENDICE No. 3

Au sujet du Mémorandum de M. Maurice, présenté au Comité de la Baleine, on répond ce qui suit:

art. 2. a. Ce serait certainement un avantage d'accorder une protection complète aux baleines immatures et aux jeunes. C'est pourquoi dans les règlements en vigueur dans les "Falkland Islands Dependencies", il est défendu de tuer des femelles accompagnées de jeunes. Il en est aussi de même pour le Congo Français et

French Congo and Angola. The Association of Norwegian Whalers has also taken the first step to protect immature whales, as in 1927 a clause in the contracts made with gunners provides that for Blue Whales measuring under 65 ft. in length only half the amount of the bonus will be paid. This regulation besides has previously been enforced in certain whaling areas. In gunner contracts for 1928/29 it is likewise provided that for Fin Whales under 55 ft. only half the bonus will be paid. It is moreover expressly stated in all contracts that females accompanied by calves are not to be killed and that calves are likewise to be protected everywhere where Norwegian whaling is carried on.

re. 2. b. The stock of Blue Whales and Fin Whales in the tropical and sub-tropical waters consists of a far larger percentage of immature animals than is the case in the Arctic and Antarctic whaling areas. Measurements, especially from Angola and Ecuador, show this very distinctly. The mature whales of these two species as a rule are in poor condition in these areas. Their bodies are often found to be covered with pustules, and the condition of the animals is on the whole questionable.

In 1927 one whaling company in Ecuador abandoned the catch on account of the condition of the animals.

It must, however, be remembered that fat and valuable whales are also to be found in these areas, though this is not usual. Thus in Walvis Bay a Blue Whale was taken which yielded over three hundred barrels of oil.

re. 2. c. The Nordkaper, the Greenland Right Whale and the Southern Right Whale ought undoubtedly to be protected. There is certainly a not inconsiderable stock of Right Whales in the Southern Seas, especially off South Georgia. In some particular years they appear in large numbers. This seems to be due to a definite sea temperature. They have been protected, however, for several years all over the Falkland Island Dependencies.

The Pacific Grey Whale should likewise be protected. It appears in the waters off Korea and Lower California. According to information from Japan, it is now protected on the Korean coast. The number taken off the coast of Mexico is not large. Thus in 1925/26 two companies captured 24 males and 17 females, in all 41 animals. In 1926/27 one company captured 2 males and 14 females, in all 16 animals.

The females, as a rule, are pregnant when they come from the south to California, where Scammon Lagoon appears to be the place at which they give birth to their young. Here, at the end of January 1926, about 100 Grey Whales were observed on a single day. The protection of these animals will, however, have but little economic significance for whalers: and as the capture, especially as regards pregnant females, is extremely detrimental to the stock, the protection of this species of whale should, if possible, be carried into effect until further notice.

l'Angola. L'Association Norvégienne des chasseurs de baleines a aussi fait le premier pas pour protéger les baleines immatures en exigeant en 1927 que l'on stipule dans les contrats des chasseurs de baleines que pour les baleines bleues au-dessous d'une longueur de 65 pieds il ne devait être payé qu'environ la moitié. Cette décision a du reste déjà auparavant été en vigueur dans certains parages. Dans les contrats des chasseurs pour 1928—29, il a aussi été stipulé qu'il ne devait être payé que la moitié environ pour les baleinoptères au-dessous de 55 pieds. Il a de plus été expressément stipulé dans tous les contrats que les femelles accompagnées de jeunes ne doivent pas être tuées, et que les jeunes doivent également être protégés partout où la chasse norvégienne a lieu.

art. 2. b. Le stock des baleines bleues et des baleinoptères des eaux tropicales et subtropicales présente un beaucoup plus grand pourcentage de jeunes qu'il n'en est le cas pour les régions arctiques et antarctiques. Des mesures fournies spécialement par l'Angola et l'Equateur le démontrent avec une grande netteté. Les baleines adultes de ces deux espèces sont, en général, maigres dans ces régions. On les trouve souvent le corps couvert de blessures purulentes et l'état de l'animal est en somme dangereux.

Une société de chasseurs de baleines à l'Equateur fut obligée en 1927 de renoncer à la chasse à cause de l'état des animaux.

Il faut pourtant se rappeler que aussi dans ces régions, on peut trouver des baleines grasses et de valeur, même si ce n'est pas ordinaire. Il a ainsi été capturé près de Walvis Bay une baleine bleue qui a donné plus de 300 fûts d'huile.

art. 2. c. Les baleines du Cap Nord, du Groenland et la baleine franche du Sud réclament absolument une protection. Il est vrai que dans les mers du Sud, spécialement au sud de Georgia, il y a un stock assez important de baleines franches. Dans certaines années, elles apparaissent spécialement en plus grand nombre. On pourrait croire qu'une certaine température de la mer joue ici un rôle. En attendant, ces baleines ont été protégées pendant plusieurs années dans les "Falkland Islands Dependencies".

La baleine grise du Pacifique doit aussi être protégée. Elle apparaît dans les eaux de la Corée et de la Basse Californie. D'après les communications du Japon, elle est aussi protégée sur les côtes de la Corée. Le nombre des baleines capturées sur les côtes du Mexique n'est pas considérable. En 1925—26, deux sociétés ont capturé ensemble 24 mâles et 17 femelles, en tout 41 bêtes. En 1926—27, une société a capturé 2 mâles et 14 femelles, soit 16 bêtes.

Les femelles sont en général pleines quand elles viennent au sud de la Californie où Scammon Lagoon semble être la place où elles mettent bas. A la fin de janvier 1926, on a remarqué là en un seul jour environ 100 baleines grises. La protection de ces animaux a peu d'importance économique pour les chasseurs, et comme la chasse, spécialement pour ce qui concerne les femelles pleines, est extrêmement onéreuse pour le stock, une protection de cette espèce de baleines pourrait être accordée jusqu'à nouvel ordre.

It cannot be necessary to protect the Sperm Whale. It is to be found in the warmer regions of the ocean, in some cases even in large numbers. Whalers are not particularly keen on taking it; for the oil yielded by the Sperm Whale is an inferior article which it has sometimes been difficult to dispose of. The Sperm Whale is now captured to the greatest extent from the two stations at Durban, where the annual catch amounts to several hundred animals.

The Humpback is protected in the Falkland Island Dependencies, and only occasional exceptions to the protection regulations are made, as the authorities can give permission for short periods, for the capture of the Humpback Whale, for instance for a week or two.

There is still a considerable stock of Humpbacks in certain regions of the ocean. Off the coast of Gabon and West Australia this is the whale that appears most frequently. Practically speaking no other species is taken here. Several hundred animals must, however, be taken annually to make the operations remunerative.

Thus in 1926, 321 Humpback Whales were caught off French Congo, but this catch was not sufficient to meet the company's expenses; the company therefore agreed to voluntary protection in 1927 and 1928. It appears as if this kind of protection ought to be quite sufficient to keep up a considerable stock of this species of whale in future.

In 1926 about 2300 Humpback Whales were captured in the different regions of the ocean, so there is doubtless still a very considerable stock of this species of whale. The catch takes place only in a few and widely spread areas:— Congo, Natal, Australia, Mexico, and to a less extent in a number of other areas.

re. 3. That the captured animals be utilised as completely as possible is of the greatest significance first and foremost for the whaler himself.

Whalers have therefore their closest attention directed to this. There are, however, here great difficulties of a purely technical nature.

The development is, however, trending in the right direction and will continue to do so gradually as the technical difficulties can be overcome within the scope of economic interests.

(signed) Sigurd Risting.

Il n'est pas nécessaire de protéger les cachalots. Cette espèce paraît, dans les mers chaudes, et même, en général, en très grande quantité. Les chasseurs de baleines ne les recherchent pas particulièrement. L'huile produite par les cachalots est une marchandise de qualité inférieure qu'il a même, en général, été difficile de vendre. On fait maintenant la plus grande capture des cachalots aux deux stations de Durban où l'on tue chaque année plusieurs centaines de bêtes.

Le Humpback est protégé dans les "Falkland Islands Dependencies", et ce n'est que par hasard que l'on fait des exceptions à cette règle, l'administration municipale pouvant donner permission de chasser le Humpback pour de courtes périodes, par exemple pour une semaine ou deux.

Il y a encore un grand stock de Humpback dans certaines mers. Vers les côtes du Gabon et de l'Australie occidentale c'est l'espèce de baleines la plus fréquente. Pratiquement parlant, on n'y capture pas d'autres sortes. Mais pour que la chasse soit profitable, il faut capturer plusieurs centaines de bêtes par année.

Vers le Congo français, on a ainsi capturé en 1926, une quantité de 321 Humpbacks, et cependant cette capture n'était pas suffisante pour couvrir les frais de la société, c'est pourquoi celle-ci a d'elle-même décrété la protection pour 1927 et 1928. Il semble que cette sorte de protection est tout à fait suffisante pour conserver un considérable stock de cette espèce de baleines pour l'avenir.

En 1926, on a capturé environ 2300 Humpbacks dans les différents parages de la mer mondiale, ce qui prouve qu'il existe encore un stock très considérable de ces sortes de baleines. La chasse n'a lieu que dans quelques parages très éloignés les uns des autres: au Congo, au Natal, en Australie, au Mexique, et en quantités moindres dans quelques autres parages.

art. 3. Il est de la plus grande importance, pour les chasseurs eux-mêmes, que les animaux capturés soient utilisés aussi complètement que possible.

Les chasseurs de baleines doivent donc consacrer toute leur attention sur ce point. Cependant ceci amène de grandes difficultés de nature purement technique.

Le développement se fait pourtant dans la bonne direction et continuera d'autant mieux que les difficultés techniques pourront être surmontées dans le cadre des intérêts économiques.

(signé) Sigurd Risting.

Sub-Committee for Considering the Memorandum of the Swedish Delegates about an Improvement in Fishing Gear.

The Sub-Committee met at 11 a. m. on June 2nd, 1928.

The Memorandum (see Appendix) had been laid before the Committee. As an introduction the following recommendation was agreed to:—

I) In view of the great destruction of food fishes just under marketable size by the present methods of fishing, the Sub-Committee recommends that experiments should be continued on an adequate scale regarding the effect of different kinds of fishing gear on the fish population in order to find out the most practical means to obviate this destruction.

After a more detailed discussion regarding the special questions involved in testing gears by the co-operating countries, the following recommendation was agreed to:—

II) The Sub-Committee recommends that the Council be asked to grant a certain sum of money for the purchase, carriage and fitting up of new types of fishing gear designed to save undersized fish in order that they may be submitted to practical tests, the money to be allotted only on the application of the Director of research in each country provided that he has already satisfied himself that the gear is practicable and worthy of trial.

The representatives of the different countries reported on the experiments with saving gear carried out in their respective countries, and the following statement is submitted regarding the work to be undertaken by each country.

1) England and Scotland will continue their analytical studies of the fishing gears in commercial use.
2) Germany will try to carry out comparative trials on commercial vessels with the ordinary otter trawl and a large pattern of the Swedish Savings trawl.
3) Sweden and Denmark will continue their experiments for improving the saving qualities of the Danish seine, otter seine and Swedish Savings trawl.
4) Poland will continue experiments on the fishing power of the normal commercial trawl and will carry out comparative experiments with the ordinary trawl and the special trawl invented in Poland.
5) Spain will continue investigations with the Swedish Savings trawl.

On the proposal of Dr. Andersson the following recommendation was adopted:—

III) That as soon as possible a volume be prepared containing special reports from each country summarising the results of their investigations on savings gear.

APPENDIX

Memorandum about an Improvement in Fishing-gear.

The trawl and the Danish "Snurrevaad" are very destructive fishing gears because they catch up to 70 or 80 per cent. of undersized young fishes which ought to be spared and allowed to live and grow 2 or 3 years longer. The effect has been highly de-

Sous-Comité pour l'examen du mémorandum des Délégués Suédois au sujet du perfectionnement des Engins de Pêche.

Le Sous-Comité se réunit à 11 a. m., le 2 Juin 1928.

Le Mémorandum (voir: Appendice), a été porté devant le Comité. La recommandation suivante est adoptée, comme introduction :

I) Devant la grande destruction de poissons alimentaires, d'une taille immédiatement inférieure à la taille marchande, par les méthodes actuelles de pêche, le Sous-Comité recommande que des expériences soient poursuivies sur une échelle appropriée, au sujet de l'effet de différents genres d'engins de pêche sur la masse des poissons, en vue de trouver les moyens les plus pratiques d'obvier à cette destruction.

Après une discussion détaillée de certaines questions concernant l'épreuve des engins par les divers Pays collaborants, la recommandation suivante est adoptée:

II) Le Sous-Comité recommande que le Bureau soit prié d'accorder une certaine somme d'argent pour l'achat, le transport et le montage de nouveaux types d'engins de pêche destinés à épargner le poisson d'une taille trop petite, afin qu'on puisse les soumettre à épreuves pratiques. L'argent ne serait accordé que sur la demande du Directeur de la recherche dans chacun des Pays, et à la condition qu'il se soit déjà assuré que l'engin proposé est praticable et digne d'épreuve.

Les représentants des divers Pays font rapport sur les expériences faites avec des engins épargneurs, et le programme de travail de chacun des Pays est soumis au Comité:

1) L'Angleterre et l'Ecosse continueront leurs études analytiques sur les engins de pêche commerciale en usage.
2) L'Allemagne tentera d'exécuter sur des navires de pêche commerciale, des essais comparatifs avec le chalut à panneaux ordinaire et avec un grand modèle du chalut épargneur Suédois.
3) La Suède et le Danemark continueront leurs expériences sur les qualités épargneuses de la seine Danoise, de la seine à panneaux et du chalut épargneur Suédois.
4) La Pologne continuera ses expériences sur le pouvoir capturant du chalut commercial normal et exécutera des essais comparatifs avec le chalut ordinaire et avec le chalut spécial inventé en Pologne.
5) L'Espagne continuera ses investigations avec le chalut épargneur Suédois.

Sur la proposition du Dr. Andersson, la recommandation suivante est adoptée:

III) Qu'il soit préparé le plus tôt possible une publication résumant dans un rapport spécial pour chaque Pays, les résultats des investigations sur les engins épargneurs.

APPENDICE

Mémorandum sur le perfectionnement des Engins de Pêche.

Le chalut et le "Snurrevaad" danois sont des engins de pêche très destructeurs, car ils capturent jusqu'à 70 ou 80 % de poissons trop petits qui devraient pouvoir vivre et croître encore pendant 2 ou 3 ans. Leur influence a été très nuisible au stock des

trimental to the stock of useful fishes that live on our fishing-grounds and the average catch of our fishing vessels has dimished in quality and quantity.

The International Council for the Exploration of the Sea has recommended the following remedies:—

1) Minimum measures for the sale of fish, so that undersized fishes should not be marketable.
2) Closed areas, on s. c. "nurseries", where the young fishes live and where trawling should be forbidden in certain seasons.

Neither of these recommendations have been generally accepted by the European Governments.

Therefore we have proposed that we should attain our aim, the protection of young immature fish, by improving the fish-gear i. e. the trawl and the seine in the manner described in a paper:—

"The Swedish Saving-trawl".

During the two last years trials have been made with this "saving-gear" in different countries with the support of the International Council in so far that travelling costs and transport etc. has been paid by the Central Bureau.

We undersigned, delegates for Sweden, propose that researches of this kind shall be continued on a larger scale embracing all constructions of nets made by inventors and experts in the co-operating countries, provided that such nets have been tried and recommended by competent specialists.

If this proposal should be accepted in principle by the Consultative Committee we recommend that a committee of 3 or 4 interested persons shall be elected immediately in order to report at the next meeting of the Consultative Committee about the measures to be taken and the expenses which can be necessary for the realisation of this investigation.

Göteborg in May 1928.

(signed) Gustaf Ekman. O. Pettersson.

poissons utiles qui vivent sur nos champs de pêche et la capture moyenne de nos navires de pêche s'en trouve diminués en qualité et en quantité.

Le Conseil International pour l'Exploration de la Mer a recommandé les remèdes suivants:

1) Des mesures de taille minimale portant sur la vente du poisson et défendant la vente des poissons "sous-minimal".
2) La fermeture de certaines aires, sur ce qu'on appelle les nourisseries, où vivent les jeunes poissons et où le chalutage devrait être interdit en certaines saisons.

Aucune de ces mesures n'a été généralement acceptée par les Gouvernements d'Europe.

C'est pourquoi nous avons proposé de chercher à atteindre notre but, la protection du jeune poisson immature, en améliorant les engins de pêche, c'est à dire, le chalut et la seine de la manière indiquée dans le travail intitulé:

"Le chalut épargneur Suédois."

Pendant les deux dernières années des essais ont été faits avec cet "engin épargneur", dans divers Pays, avec l'assistance du Conseil International; des frais de voyage, de transport etc. ont été payés par le Bureau Central.

Nous soussignés, Délégués pour la Suède, proposons que des recherches de ce genre soient continuées sur une plus large échelle et embrassant tous les genres de filets construits pas des inventeurs et des experts dans les divers Pays, pourvu que ces engins aient été essayés et recommandés par des spécialistes compétents.

Si cette proposition serait acceptée, en principe, par le Comité consultatif, nous recommanderions qu'un Comité de 3 ou 4 personnes intéressées soit nommé immédiatement et chargé de faire rapport à la prochaine réunion du Comité consultatif sur les mesures à prendre et sur les crédits qui seraient nécessaires pour la réalisation de cette recherche.

Göteborg, Mai 1928.

(signé) Gustaf Ekman. O. Pettersson.

Reports of Scientific Meetings.

Estimation of Nitrogen and Phosphates in Sea-Water.

June 4th, 1928, 11,30 a. m.

The Chair was taken by Professor Johan Hjort.

In a short introductory speech the Chairman pointed out that the arrangement of scientific meetings was an innovation which had been under consideration for some years past. Since the war, the membership of the Council had been greatly increased and its operations extended over a wider area, with the result that a considerable rearrangement of the routine work had been necessary. The problem was resolved by the appointment of Committees to deal with the work in a number of prescribed areas. This arrangement is working smoothly after the experience of some years, and now it has been possible to arrange these scientific meetings at which representatives of all adhering countries can come together and discuss in common scientific problems of general interest. It is hoped that the meetings held this year will be the first of a long series.

The following communications were read:—

1) Prof. K. Brandt: Methods for the study of phosphates and nitrogenous compounds in sea-water.
2) Prof. J. Giral: Some observations on the subject: Methods for the study of phosphates and nitrogenized matter in sea-water.
3) Dr. Schreiber: Methods for a physiological analysis of sea-water.
4) Dr. Kurt Buch: On nitrogenous compounds and phosphates in sea-water and their determination.
5) Dr. W. Harvey: Estimation of phosphates and nitrates in sea-water.
6) Mr. Oscar Sund: Determination of nitrate in northern waters in 1927 and 1928.
7) Dr. H. Wattenberg: The study of phosphates and nitrates made by the German Atlantic Expedition.

The Chairman thanked each of the lecturers for his valuable contribution to the success of the meeting, and expressed the hope that the lecturers would consent to arrange their lectures in a form convenient for publication. He asked them also, if they would agree to do this, to set out their material in phraseology which could be understood in as wide a circle as possible.

It was originally intended that the lectures should be followed by a general discussion, but it was eventually decided that it would be better for the lectures first to be published and for a discussion to be held after an opportunity had been given to members to read the publication.

Rapports des Réunions Scientifiques.

Recherche de l'Azote et des Phosphates dans l'Eau de Mer.

Le 4 Juin 1928, à 11,30 a. m.

La chaire est occupée par le Prof. JOHAN HJORT.

Dans une courte allocution introductive, le Président rappelle que l'organisation des réunions scientifiques est une innovation qui a été tenue en considération depuis plusieurs années. Depuis la guerre, la composition du Conseil a été fortement augmentée et ses opérations s'étendent sur un champs plus vaste. Il en est résulté la nécessité d'une réorganisation du travail courant. Le problème a été résolu par la formation de Comités chargés du travail dans un certain nombre d'aires définies. Cet arrangement, après quelques années d'essai, fonctionne d'une manière satisfaisante, et aujourd'hui il est devenu possible d'organiser des réunions scientifiques auxquelles les représentants des Pays adhérents peuvent se rencontrer et discuter en commun des problèmes scientifiques d'intérêt général. On espère que les réunions de cette année seront les premières d'une longue série.

Les communications suivantes sont lues:

1) Le Prof. K. BRANDT: Méthodes de recherche des phosphates et des composés azotés dans l'eau de mer.
2) Le Prof. J. GIRAL: Quelques observations sur les thèmes: Méthodes pour l'étude des phosphates et des matières azotées dans l'eau de mer.
3) Le Dr. SCHREIBER: Méthodes pour une analyse physiologique de l'eau de mer.
4) Le Dr. KURT BUCH: Sur les composés azotés et les phosphates dans l'eau de mer et leur dosage.
5) Le Dr. W. HARVEY: Estimation des phosphates et des nitrates dans l'eau de mer.
6) Mr. OSCAR SUND: Détermination des nitrates dans les eaux septentrionales en 1927 et 1928.
7) Le Dr. H. WATTENBERG: Les recherches de phosphates et de nitrates de l'Expédition Atlantique Allemande.

Le Président remercie les auteurs pour leurs importantes contributions au succès de la réunion et exprime l'espoir qu'ils voudront bien donner à leurs communications une forme adaptée aux nécessités de la publication. Il leur demande aussi de bien vouloir exposer leur matière en termes compréhensibles pour le plus grand nombre possible de lecteurs.

Il avait été prévu que les communications seraient suivies d'une discussion générale, mais il a été décidé ensuite de remettre cette discussion jusqu'après la publication des travaux.

Racial Investigations.

June 5th, 1928, 11,30 a. m.

Professor JOHAN HJORT opened the meeting and proposed the agenda for the day. The following communications were received:

1) Prof. EHRENBAUM: Racial investigations on food-fishes, especially herring.
2) Mr. EINAR LEA: The herring scale as a certificate of origin, and its use in racial investigations.
3) Dr. E. S. RUSSELL reported the results of a test carried out by Mr. EINAR LEA on the possibility of distinguishing Norwegian and English herring by the examination of their scales (see the note appended).
4) Dr. ED. LE DANOIS: On the local races of the sardine of France.
5) Dr. FERNANDO DE BUEN: On the local races of the sardine of Spain.
6) Dr. RAMALHO: On the local races of the sardine of Portugal.
7) Dr. J. J. TESCH: Race investigations on herring races in the Southern North Sea.
8) Dr. A. C. JOHANSEN: On some characters of the Baltic plaice which have changed during the last decennaries.

After this the Chairman stated that

9) an abstract of a paper of Professor G. BRUNELLI entitled:— "Researches on the species of food fishes" had been laid before the meeting.
10) Mr. O. SUND on behalf of Mr. P. BJERKAN communicated a paper on the validity of the "race characters" of the food-fishes.
11) Mr. A. BRUUN submitted on behalf of Prof. JOHS. SCHMIDT a paper on "Racial investigations of the cod".

Resolutions.

I) That discussion of the communications received should be postponed until the next Council Meeting.
II) That the publication in a special volume of the communications received be recommended.
III) That the Consultative Committee be asked to reserve one entire day at the next Council Meeting for the discussion of the report of the scientific meetings.

In connection with Resolution II, Dr. JOHANSEN and Dr. JACOBSEN consented to assist Captain SCHØNING in the editing of the work.

Prof. EHRENBAUM expressed the thanks of the meeting to the Chairman.

The meeting was closed at 5 p. m.

APPENDIX

Note by Dr. E. S. RUSSELL.

Dr. RUSSELL reported the results of a test carried out by Mr. EINAR LEA on the possibility of distinguishing Norwegian and English herrings by the examination of their scales. A mixed sample of Norwegian and English herring which had been col-

Investigations sur les Races.

Le 5 Juin 1928, à 11,30 a. m.

Le Prof. HJORT ouvre la séance et propose le programme de la journée.

Les communications suivantes sont reçues:

1) Le Prof. EHRENBAUM: Investigations sur les races des poissons alimentaires, et spécialement sur le hareng.
2) Mr. EINAR LEA: L'écaille du hareng comme certificat d'origine, et son emploi dans les recherches sur les races.
3) Le Dr. RUSSELL relate les résultats d'une épreuve dirigée par Mr. EINAR LEA, sur la possibilité de distinguer le hareng Norvégien et le hareng Anglais par l'examen de leurs écailles (voir la note annexée).
4) Le Dr. Le DANOIS: Sur les races locales de la sardine de France.
5) Le Dr. FERNANDO DE BUEN: Sur les races locales de la sardine d'Espagne.
6) Le Dr. RAMALHO: Sur les races locales de la sardine de Portugal.
7) Le Dr. J. J. TESCH: Recherches sur les races du hareng dans le Sud de la Mer du Nord.
8) Le Dr. A. C. JOHANSEN: Sur quelques caractères de la plie Baltique qui ont changé au cours du dernier décennaire.
9) Le Président annonce qu'un travail du Professeur BRUNELLI intitulé: "Recherches sur les espèces des poissons comestibles", a été déposé.
10) Mr. O. SUND, de la part de Mr. BJERKAN, présente une communication sur la validité des caractères raciaux des poissons alimentaires.
11) Mr. A. BRUUN présente, de la part du Prof. J. SCHMIDT, un travail sur des Investigations concernant les races du cabillaud.

Résolutions.

I) Que la discussion des communications reçues doit être différée jusqu'à la prochaine réunion du Conseil.

II) Que la publication des communications reçues en un volume spécial soit recommandée.

III) Que le Comité consultatif soit prié de réserver, lors de la prochaine réunion du Conseil, une journée entière à la discussion des rapports de la réunion scientifique.

Au sujet de la Résolution II, le Dr. JOHANSEN et le Dr. JACOBSEN acceptent d'assister le Commandant SCHØNING dans la publication de l'ouvrage.

Le Prof. EHRENBAUM exprime au Président les remerciements de l'assemblée.

La réunion est close à 5 h. p. m.

APPENDICE

Note par Mr. le Docteur E. S. RUSSELL.

Mr. le Docteur RUSSELL signale les résultats obtenus par une expérience faite par Mr. EINAR LEA sur la possibilité de distinguer les harengs Norvégiens des harengs Anglais par leurs écailles. Une collection de harengs Norvégiens et Anglais recueillie et arrangée,

lected and arranged without Mr. LEA's knowledge, was submitted to him for examination, a key being kept showing which scales were of Norwegian and which of English origin. The results obtained by Mr. LEA are shown in the table below together with the correct readings transcribed from the key. A comparison of the two columns shows that in about 90 per cent. of cases Mr. LEA had been successful in distinguishing the two classes of scales.

Symbols: e = English scale r = regenerated scale re = regenerated English scale
n = Norwegian — b = unsuitable — rn = — Norwegian —
fr = foreign looking but not necessarily English scale.

Nr.	Lea's opinion	Correct	Nr.	Lea's opinion	Correct	Nr.	Lea's opinion	Correct	Nr.	Lea's opinion	Correct	Nr.	Lea's opinion	Correct	Nr.	Lea's opinion	Correct
1	n	n	21	n	n	41	fr	e	61	e	e	81	n	n	101	n	n
..	e	e	..	n	n	..	e	n	..	e	e	..	e	e	..	e	e
..	n	n	..	e	e	..	re	e	..	e	e	..	re	e	..	e	e
..	n?	e	..	n	n	..	re	e	..	e	e	..	n	n	..	n	n
5	n?	e	25	e	e	45	n	n	65	n	e	85	n	n	105	e	n
..	n?	e	..	n	n	..	n	e	..	n	n	..	e	e	..	n	n
..	n	n	..	e	e	..	n	n	..	n	n	..	e	n	..	e	e
..	r	e	..	e	e	..	n?	n	..	n	n	..	n	n	..	n	n
..	e	e	..	e	e	..	n	n	..	e	e	..	n	n	..	e	e
10	n	n	30	e	e	50	e	e	70	e	e	90	e	e	110	n	n
..	e	e	..	n?	e	..	re	e	..	n	n	..	n	n	..	n	n
..	n	e	..	e	e	..	n	n	..	n	n	..	e	e	..	n	n
..	n?	n	..	n	n	..	re	e	..	e	e	..	re	e	..	e	e
..	n	n	..	n	n	..	n	n	..	e	e	..	e	e	..	n	n
15	re	e	35	n	n	55	n	n	75	n	e	95	n	n	115	e	e
..	e	e	..	fr	e	..	n	n	..	rn	n	..	n	n	..	n?	e
..	rn	n	..	e	e	..	n	n	..	n	n	..	n	n	..	e	e
..	rn	e	..	n	n	..	e	e	..	n	n	..	e	e	..	n	n
..	n	n	..	e	e	..	e	e	..	n	n	..	e	e	..	b	e
20	e	e	40	re	e	60	n	e	80	e	e	100	e	e	120	n	n

à l'insu de Mr. Lea, furent soumis à son examen — tout en gardant une clef montrant l'origine des écailles. On trouvera dans la table ci-dessous les résultats obtenus par Mr. Lea et l'indication juste d'après la clef. Une comparaison des deux colonnes prouvera que dans les 90 % des cas, Mr. Lea a réussi à déterminer les deux classes d'écailles.

Signes: e = écaille anglaise r = écaille régénerée re = écaille régénerée anglaise
n = — norvégienne b = — inapte rn = — — norvégienne
fr = — d'un air étranger, mais pas nécessairement anglais.

Nr.	avis de Mr. Lea	juste	Nr.	avis de Mr. Lea	juste	Nr.	avis de Mr. Lea	juste	Nr.	avis de Mr. Lea	juste	Nr.	avis de Mr. Lea	juste	Nr.	avis de Mr. Lea	juste
1	n	n	21	n	n	41	fr	e	61	e	e	81	n	n	101	n	n
..	e	e	..	n	n	..	e	n	..	e	e	..	e	e	..	e	e
..	n	n	..	e	e	..	re	e	..	e	e	..	re	e	..	e	e
..	n?	e	..	n	n	..	re	e	..	e	e	..	n	n	..	n	n
5	n?	e	25	e	e	45	n	n	65	n	e	85	n	n	105	e	n
..	n?	e	..	n	n	..	n	e	..	n	n	..	e	e	..	n	n
..	n	n	..	e	e	..	n	n	..	n	n	..	e	n	..	e	e
..	r	e	..	e	e	..	n?	n	..	n	n	..	n	n	..	n	n
..	e	e	..	e	e	..	n	n	..	e	e	..	n	n	..	e	e
10	n	n	30	e	e	50	e	e	70	e	e	90	e	e	110	n	n
..	e	e	..	n?	e	..	re	e	..	n	n	..	n	n	..	n	n
..	n	e	..	e	e	..	n	n	..	n	n	..	e	e	..	n	n
..	n?	n	..	n	n	..	re	e	..	e	e	..	re	e	..	e	e
..	n	n	..	n	n	..	n	n	..	e	e	..	e	e	..	n	n
15	re	e	35	n	n	55	n	n	75	n	e	95	n	n	115	e	e
..	e	e	..	fr	e	..	n	n	..	rn	n	..	n	n	..	n?	e
..	rn	n	..	e	e	..	n	n	..	n	n	..	n	n	..	e	e
..	rn	e	..	n	n	..	e	e	..	n	n	..	e	e	..	n	n
..	n	n	..	e	e	..	e	e	..	n	n	..	e	e	..	b	e
20	e	e	40	re	e	60	n	e	80	e	e	100	e	e	120	n	n

Memorandum regarding the Relations between the League of Nations and the International Council for the Exploration of the Sea.

The League of Nations desiring to establish relations with the International Council for the Exploration of the Sea with regard to the question of the rational exploitation of the resources of the Sea has instructed its Economic Committee to seek the co-operation of the Council in the examination of the subject. The Economic Committee has drawn up a provisional report based upon a preliminary consideration of the various problems involved, and has sent a copy of this report to the Council, thus, in effect, inviting the Council to formulate, if possible, answers to certain questions referred to below, and further to formulate a method of continuous co-operation between the two institutions for their further study.

Representatives of the Committee have discussed this subject with the Bureau and the Bureau has explained to them the constitution and function of the Council and the limitations imposed thereby upon the Council's liberty of action. In particular it has been explained that the members of the Council are responsible to their respective Governments, whose Delegates they are, and that the Council is not, therefore, in a position to submit to another body with a different constitution concrete proposals involving international action. Such proposals emanating from the Council would be formally submitted through the Danish Foreign Office to the participating Governments for their consideration and it rests with the Governments, if they see fit, to take such steps as may be necessary to translate the proposals of the Council into the form of a convention. One such step may very well be to submit the proposals to the League of Nations for discussion, especially if it be desirable to secure the adhesion to the proposals of other Governments who are not represented in the Council but are represented in the League.

On the other hand, in so far as the League desires scientific information on facts within the knowledge of the Council and its experts, the Council is not only at liberty, but is more than willing to place such information at the disposal of the League and to give the League expert assistance in the further elucidation of the facts.

The question which the Economic Committee has been instructed to study in collaboration with the Council is in the language of the letter of 18th April 1928 received from the League (translated) "whether, under what conditions, in respect of what species and in what regions an international protection of the fauna of the sea might be established."

This general question has in subsequent discussions been considered under three heads as referring to 1) food fishes, 2) seals, sea-lions etc. and 3) the great cetaceans.

As regards 1) the answer of the Council must be that the study of the food fishes, with reference, *inter alia* to the necessity, if any, for protective regulations, has been the chief subject of the Council's investigations during the past twenty-five years; but that whatever conclusions may be drawn either now or eventually from these inquiries, the problem is not one which lends itself to treatment by means of an international convention of general application. The problems of the fisheries vary from sea to sea and from latitude to latitude. The fish population of one sea and of one latitude is different from that of another and even a given species of fish may be found to require protection in one area which it does not require in another. It follows then that fishery problems are so localised as to be of interest only to those nations whose fishermen have access to the localities and fisheries concerned and, if and when the necessity for regulation of any of the local fisheries arises it will be a matter for treatment by agreement between the nations interested and between them alone. It is questionable, therefore, whether in the matter of the regulation of the fisheries for food-fishes the intervention of the League would have any practical utility. Actually the Council includes representatives of all the countries interested in the fisheries of the North Eastern Atlantic and its subsidiary seas except Russia, and it is reasonable to suppose that the conclusions of the Council will, within the limits of practicability, be translated into action by the constituent Governments.

As regards 2) the Council is not at present competent to express an opinion since hitherto it has only studied seals in European waters in their relation to fisheries and not from the point of view of their commercial exploitation.

As regards 3) the question of whaling stands on a somewhat different footing to that of the fisheries for food fishes. The following facts have to be taken into consideration:—

a) The actual range of the migration of the different species of whales, although it cannot yet be stated with precision, is undoubtedly so wide that any regulation that it may prove desirable to apply would probably need to be adopted universally in order to be wholly effective.
b) There is widespread apprehension lest continued exploitation at the present rate and by the present methods may so reduce the stock of whales that whaling may in the near future cease to be a profitable enterprise.
c) In the Falkland Islands and their Dependencies and in certain other areas regulations of whaling notably, for the protection of young and immature whales and of cow whales with their calves, and for the avoidance of wasteful exploitation by insisting on the utilisation of the whole carcase, are already enforced as regards licensed stations and factories both ashore and afloat.
d) But this system (i. e. enforcement of regulations as a condition of licenses) cannot be applied to pelagic whalers, a considerable number of which have commenced operations, because these vessels operate outside territorial waters and are thus free from territorial control.

e) Proposals for the legislative control of whaling operations have been advanced within the last two years, in particular:—
   1) The "projet de convention" advanced by the Government of the French Republic, of which the League of Nations has already been apprised, and
   2) A draft of a domestic law submitted by the Norwegian Government to the International Council the general effect of which is to apply to all Norwegian whaling enterprises, including those for pelagic whaling, the same regulations as are already applied to licensed whaling stations and factories under British control in antarctic, or sub-antarctic waters.

f) The Council, which, in any case, is competent only to discuss such proposals from the scientific point of view, has been able only to express a very guarded opinion about them, because

g) Informations as to the life history of the principal species of whales, their migrations, the rate of reproduction as compared with the rate of destruction and similar matters is at present far from complete.

Investigations are at present in progress for the elucidation of the material facts and it is only in the light of a fuller knowledge of the facts that the necessity for regulations and the form they should take could be intelligently discussed.

In the light of these considerations the Council is not at present disposed to advance any concrete proposals for the regulation of whaling for embodiment in an international convention of general application. Nor is it prepared to go further than to endorse the principle generally accepted in theory, that every Government concerned should, so far as it has the power, prevent the wasteful exploitation of whales. This appears to the Council to be a self-evident proposition the practical application of which would involve 1) measures to prevent the destruction of young and immature whales and the exploitation of assemblies of whales, if any such can be clearly distinguished, which are, for any cause, generally in such poor condition that a profitable exploitation of them must involve extravagant destruction, and 2) insistance upon the utilisation of so much of the carcases of any whales taken as has any commercial value.

The Method of Co-operation between the League of Nations and the Council.

With regard to the question of continuous co-operation with the League of Nations in respect of such matters as are within the competence of the Council, the Council undertakes:—

1) To furnish copies of all relevant reports published by it to the Economic Committee of the League.
2) To submit, from time to time, to the appropriate Committee of the Council any technical and scientific question upon which the League of Nations may seek information or advice from the Council.
3) To designate as occasion requires experts to assist the Economic Committee in its deliberations on any special question within the competence of the Council by information

on and explanation of material facts, whether such questions arise on the motion of the Committee or in connection with concrete proposals submitted by the Council to the participating Governments and, by those Governments, either directly or through the Council, to the League of Nations, and

4) To give a general instruction to the President of the Council and the Chairman of the Consultative Committee to correspond with the Economic Committee as occasion may require to facilitate these arrangements.

REPORT

of

ADMINISTRATION 1927—1928.

I. General.

Composition of the International Council for the Exploration of the Sea.

Italy joined the Council just before the Council Meeting in May 1927. The adherence of Italy is to be reckoned from 22nd July 1926 and the Delegates appointed by the Italian Government are:— H. E. Admiral Paolo Thaon di Revel and Professor G. Magrini.

Composition of the Bureau.

In accordance with the Council's resolution at its last meeting the Bureau will in future consist of: a President and 4 Vice-Presidents instead of as hitherto of a President, 3 Vice-Presidents and a General-Secretary. The members of the Bureau are: Mr. H. G. Maurice, President, Professor Johan Hjort, Professor Otto Pettersson, M. Théodore Tissier, Dr. C. Heinrici, Vice-Presidents.

Committees.

A list of the Committees will be found in the Procès-Verbaux of the last Council Meeting. All these Committees remain in being and, with the exception of the Moray Firth Committee which has reported on the special subject which it was appointed to examine, continue their activities.

Audit of Accounts.

The Accounts of the Council for 1926—27, audited by a qualified accountant and examined and found correct by the Finance Committee, will be submitted to the Council for final approval.

A statement is given below of the Accounts for 1927—28 which have to be examined by the Finance Committee.

Statement of Accounts for the financial year 1927—1928.

Receipts:

			Estimates	Real Receipts
I.	1.	Balance brought forward from 1926—27	195 294.25	195 294.25[1])
II.	2.	Annual contributions of the Governments:		
		for 1926—27	177 000.00	87 000.00
		- 1927—28		110 000.00
III.	3.	Interest on Bank deposit	4 000.00	4 690.88
IV.	4.	Sale of publications	1 000.00	2 116.07
		Total Kr.	377 294.25	399 101.20

Expenditures:

			Estimates	Real Expenditures
I.	1—6.	Incidental expenses	26 000.00	26 200.00
II.	7—10.	Assistance etc.	33 500.00	30 285.91
III.	11.	Expenses of the office in Copenhagen	15 600.00	14 283.34
IV.	12.	Travelling expenses	18 000.00	22 523.22
V.	13.	Chairmen of Committees	26 250.00	26 250.00
VI.	14.	Special Resolutions of the Council	36 046.69	24 765.69
VII.	15.	Printing and distribution	72 611.82	50 911.36
		Total Kr.	228 008.51	195 219.52

Receipts	per 31/3 1928	Kr. 399 101.20
Expenditures	per 31/3 1928	- 195 219.52
Cash balance	per 31/3 1928	**Kr. 203 881.68**

Of this Balance there were deposited in Kjøbenhavns Handelsbank and cash	Kr. 154 812.66
Danish Treasury Bills, nominal Kr. 51.600,00, deposited in a box in the bank. (Market value on March 31st Kr. 51 600.00.) Purchase value	» 49 069.02
	Kr. 203 881.68

All Contributions for 1926—27 have been received, and furthermore Kr. 20 000.00 from Italy. The following countries have not yet paid their Contributions for 1927—28: Belgium, Great Britain, Finland, Italy, the Netherlands, Portugal and Latvia.

Special reserve for pensions, deposited on a special account in the bank: Kr. 6 758.16.

[1]) + Russia's contribution for 1914/15, **Rbl. 14 430.54,** deposited in a Leningrad bank has not yet been recovered.

Meetings.

Meetings of the Bureau attended by all members were held in Copenhagen and Stockholm in May—June and in London in October 1927.

Meetings of the Hydrographical Sub-Committee (Professor M. KNUDSEN, Professor G. SCHOTT, Mr. P. M. VAN RIEL, and Mr. J. R. LUMBY) were held in Copenhagen from the 3rd to the 5th November 1927 and from the 19th to the 23rd April 1928. A Report of these meetings was submitted to the Hydrographical Committee on May 7th.

Meetings of the joint Baltic and Transition Area Committees were held in Copenhagen on the 14th and 15th November 1927. They were attended by:— Dr. K. A. ANDERSSON, Dr. A. C. JOHANSEN, Professor O. PETTERSSON, Professor M. KNUDSEN, Professor M. SIEDLECKI, Professor H. HENKING, Professor T. H. JÄRVI, Dr. S. STRODTMANN, Dr. E. FISCHER and Mr. P. BJERKAN. The Report of this Committee has been circulated to the members of the Baltic and Transition Area Committees, to the Bureau and to the Consultative Committee.

II. Work of the Bureau at Copenhagen.

At its meeting in London in October 1927 the Bureau offered the post of Administrative Secretary to Captain SCHØNING who accepted this post.

Besides administrative work, correspondence etc. the following work has been carried out:—

A. Publications.

Report regarding the publications issued and cost of same during the financiel year 1927—28 per $^{31}/_{3}$ 1928.

Series	Volume and Subject	Author	No. of Copies	Cost Kr.	Remarks
Rapports et Procès-Verbaux	XLI. Procès-Verbaux, 1926		800	4 829.50	
—	XLII. Production of Plankton in the Oslo Fjord	T. GAARDER and H. H. GRAN	800	1 288.50	
—	XLIII. River Pollution and Fisheries	Dr. H. C. REDEKE	800	944.80	
—	XLIV. Rapport Atlantique, 1926	ED. LE DANOIS and RAFAEL DE BUEN	800	3 183.22	
—	XLV. Procès-Verbaux, 1927		800	3 009.65	
—	XLVI. Apparatus and methods for Oceanographical Research conducted in a ship under way	J. HABERT	800	1 147.85	
Occasional Reports	Closure of Moray Firth to Trawling	Moray Firth Committee	50	4 030.35	Printed as manuscript
—	Protection of Whales	Whaling Committee	200	486.10	Printed as manuscript
		to carry forward...		18 919.97	

Series	Volume and Subject	Author	No. of Copies	Cost Kr.	Remarks
		Brought forward...		18 919.97	
Occasional Reports	Copepods from the "Michael Sars" Expedition, 1924	LEIF STØRMER	800	1 085.15	To be incorporated in N.E. Area Report
Bulletin	Bulletin Hydrographique, 1926		800	2 569.88	
—	Appendix to the above — Germany and Latvia		900	918.00	
—	Bulletin Trimestriel, No. 1, 1927		200	629.50	
—	Bulletin Trimestriel, No. 2		200	603.00	
—	Bulletin Trimestriel, No. 3		200	812.32	
—	Bulletin Trimestriel, No. 4		200	719.75	
—	Bulletin Statistique, Vol. XIV, 1924		800	1 775.00	
—	Bulletin Statistique, Vol. XV, 1925		800	1 328.80	
Journal du Conseil	Vol. II, No. 1		750	2 533.30	Cost includes fees to contributors, translations, blocks, etc.
	Vol. II, No. 2		750	3 298.25	
	Vol. II, No. 3		750	3 005.09	
	Vol. III, No. 1		750	2 836.70	
			Total...	41 034.71	
Other Costs of Publications:					
	Distribution			2 000.82	
	Drawings, translations, etc.			2 979.72	
	Translations and blocks for Anniversary Volume			896.11	
	Paid on account of publications in the Press...			4 000.00	
			Grand Total...	50 911.36	

B. Hydrographical Department.

Account of work executed:

I. Editorial work.

The Service Hydrographique has supervised the publication of the following papers:

	Title	Time of appearance
1)	Bulletin Hydrographique, 1926	May 1927
2)	Appendice d'Observations de l'Allemagne pour 1919—1925 et de la Lettonie pour 1925 et 1926	May 1927
3)	Bulletin trimestriel (1927) No. 1	May 1927
4)	— — — - 2	September 1927
5)	— — — - 3	December 1927
6)	— — — - 4	April 1928

	Title	Time of appearance
7)	Rapp. et Proc.-Verb. Vol. XLIV, Rapport Atlantique	May 1927
8)	— - XLVI, Contributions aux Appareils et aux Méthodes destinés aux recherches océanographiques pratiquées à bord d'un navire en marche	March 1928
9)	Circulars:	
	a) On extended participation in the Atlantic liners surface observations, with charts	June 1927
	b) On projected chart of the S. North Sea and the English Channel together with "Additional note to No. 3 of the Bull. trim. for 1927"	January 1928
	c) Note on fulfilment of the Stockholm program of 1927 for extension of the international net of surface observations in the Atlantic, with 2 charts	April 1928

II. Other work.

The English representatives in Stockholm having expressed their wish to have all available data of $t°$ and $S\,{}^0/_{00}$ for each decade plotted on enlarged charts of the North Sea and sent them in monthly batches, work on these lines was started after the end of the meeting, but was however stopped on the suggestion of Mr. LUMBY when attending the Sub-Committee meeting in November.

The computing of means for certain sections in the North Sea on the basis of the data of the bulletins for the best investigated periods before the war has been continued as far as time and occasion have permitted, as has also the study of the English trawling statistics in relation to the outflow from the Elbe.

In accordance with a suggestion made by Professor KNUDSEN at the end of October preparatory work regarding the calculation of salinity decade normals of the North Sea was done on behalf of the Sub-Committee meeting in November.

On the occasion of a visit which the Hydrographical Assistant paid to the laboratories at Lowestoft and Aberdeen conferences were held with Messrs. BORLEY and BOWMAN on matters connected with the work of the Service Hydrographique.

C. Statistical Department.

The Bulletin Statistique for the year 1925 was distributed at the end of 1927 and the work at the Bulletin for 1926 has been carried on during the year 1927 and the spring of 1928 with the result that the statistics for this year are nearly finished, but the material from Finland, Iceland and Spain is not yet in the hands of the Bureau. It is hoped that the printing may be started very soon.

Reports of the Area Committees.

NORTH-EASTERN AREA
1927.

By

Oscar Sund.

Although much more work is to be desired in this great area which is of so great importance to the fisheries of Norway, Russia, Great Britain and Germany, the amount of investigations done in the last few years and especially in 1927 is nevertheless much larger than ever before, and there is every reason to hope for a gradual extension of the activities of the different countries which share the responsibility for the provision of a systematic knowledge of the natural basis of the fisheries in these seas.

Of the countries represented on the International Council the following have carried out work to a greater or less extent in the North-Eastern Area during 1927: Norway (oceanographic and plankton work, biological statistics of cod, sprat and herring, marking of cod), Germany (oceanographic and plankton work), Finland (biological investigations), Sweden (oceanographic work) and Denmark (racial study of the cod). Russia has also carried out work of different kinds, but nothing definite is known as to the scope and amount of investigations effected.

The following is a brief account of the investigations in 1927 based on reports received from the different organisers of the researches:—

Norway.

1) Professor Johan Hjort organised as in 1926 a series of investigations on the coast of Møre in close connection with the whale fishery from the whaling station at Aukra (near Molde). In 1927 six cruises were conducted from Julsund (between Aukra and the mainland) outwards to Storeggen (the edge of the continental shelf) along the same section as in 1926 and with stations at the same places. This section was repeated on the following dates: March 1st and 28th, May 3rd, June 1st and 29th and July 31st, with, accordingly, about 4 weeks between the cruises. On the other hand some cruises were also made into the Romsdal Fiord with two stations repeated each time, one in the Forfiord, near Molde, and the other in the Romsdal Fiord, at 62° 34′5 N., 7° 7′8 E. From all stations chlorine and oxygen samples were taken with determinations of temperature and p_H (Mc. Clendon) at standard depths, and on nearly all cruises samples for

quantitative determination of the phytoplankton were taken as well as vertical zooplankton hauls. As a rule also horizontal hauls were made. On the 21st of May a station with a series of horizontal hauls were made in the deep channel 9′5 N.W. of Ona light, especially with a view to sampling the euphausid population.

In conjunction with these investigations at sea, the oceanographical laboratory at Aukra was busy the whole season in collecting observations on the whales and examining samples of euphausids found in the gully and stomach of landed whales at the whaling station.

From the 16th of March to the 10th of April Prof. H. H. Gran with an assistant took part in the investigations, mainly working on bacteria and the organic matter dissolved in sea water.

In the week from July 14th to 21st Prof. Hjort's assistant, Mr. Ruud was given the opportunity of going in a whaler to the fishing grounds and was thus able to make vertical as well as horizontal tow-nettings in different localities, from Tampen in a north-easterly direction up to the Halten Bank.

On the 9th of August the motor cutter "Morild" (which was also used for the cruises mentioned above, except the last cruise into the Romsdal Fiord, which was made by the Swedish research steamer "Skagerak") made a cruise out to sea in collaboration with the "Skagerak", but on account of a severe N.E. gale work had to be restricted to hydrography.

The results of the work in 1927 will be published in the near future: on the phytoplankton by Prof. Dr. H. H. Gran, the hydrography by Dr. Martens of the Swedish Commission and the copepods by Mr. Ruud. The latter has also sent to the Journal of the Council a short article on his observations on the euphausids in 1927.

2) The work organised by the Norwegian Director of Fisheries consisted of:— a) Oceanographical and plankton work with the motor cutter "Johan Hjort" under the direction of Mr. Oscar Sund, b) Biological statistics of the herring under the direction of Mr. Einar Lea and of the cod under that of Mr. Sund, and c) marking of spawning cod under the direction of Mr. Ed. J. Havnø.

a) The "Johan Hjort" was in commission in the North-Eastern Area from February 22nd to July 23rd. The work was commenced on the cod fishing grounds near Aalesund in the last days of February in order to get data for comparison with the area which has been yearly investigated during the cod season since 1922, the West Fiord (Lofoten) and adjacent waters outside the Lofoten Islands. The waters near Aalesund were characterised by a much thinner layer of cold coastal waters than found in the West Fiord during all the seasons since 1922, (and also in earlier years) while the deep water was more than one degree warmer than the Atlantic water filling the deep basin of the West Fiord. It is believed that these conditions may have a connection with the marked contrast between the produce of the cod fishing in the Møre and the Lofoten area.

At Lofoten the "Johan Hjort" was in commission from the 4th of March to the 12th of May. The coastal water was found to be very deep (100 metres and more as against only 25 to 40 at Møre) and the thermoclines usually very marked. The plankton was

extremely scarce, but the fishing was as rich as it was poor on the Møre coast. The reason for the scarcity of at least the phytoplankton in this area was found when in the end of March investigations on the nitrate and phosphate contents of the sea water were commenced. It was found that these substances were totally or nearly absent from the upper water-layers down to a depth of 50 to 100 metres, i.e. throughout the whole thickness of the photozone, while very rich supplies were found in deeper water. This statement holds good for the whole of April and the first half of May when the vessel moved on to Finmark, both in the West Fiord and its branches running inland and the banks outside as investigated in the end of April. The only place where an appreciable amount of nitrate and phosphate was found, was on the edge of the continental shelf where also comparatively rich plankton enlivened the sea.

In the latter half of May the "Johan Hjort" moved on to East Finmark, making short sections out from land on the voyage north, and in June the area in the mouth of the Varanger Fiord as well as the waters to the North of the Fisherman's Peninsula were worked with sections repeated three or four times. Also in these waters an unusual scarcity of plankton was experienced and the conditions as to the amount of plant nutritients in the sea were exactly similar to those found at Lofoten.

The work in the Finmark waters was concluded with a series of N.-S. sections, the most easterly at 34°30′ E. and northwards to Lat. 71°30′, then on the meridian of the North Cape to Lat. 72° N. and on the Long. 20° E. from Lat. 71° N. During the voyage south a number of fiords were investigated, especially as to the occurrence of plant fertilizers, and it was generally found that the upper layers were nearly totally deficient in this while the deep water contained great quantities, with one exception, the Ulsfiord, where no nitrate could be found even at 120 metres. The explanation of this seems to be found in the fact that the bottom temperature on that occasion was more than 2.6 degrees higher than on a previous examination (Sept. 1922) while the other fiords in the vicinity had retained their very low bottom temperature. Obviously the entire inner basin of the Ulsfiord had at some time previously exchanged its water for inflowing water of a higher temperature and deficient in nitrates.

These investigations on the fertilizing substances in the sea, which were rendered possible in a small vessel only through the simplifications of method introduced by the Plymouth investigators Atkins and Harvey, have been mentioned with so much detail here because they seem to be of extreme importance to fishery research in northern waters, and one may surmise that they will afford a clue to the understanding of more than one aspect of life in the sea.

The work of the "Johan Hjort" in the North-Eastern Area was concluded with a series of sections in the West Fiord and adjacent fiords between the 16th and the 23rd of July. On the 25th of July a conference took place in a harbour near Bodø between the staffs of the "Johan Hjort" and of the German Reichsforschungsdampfer "Poseidon", which was on its way north to the Barents Sea. After that the "Johan Hjort" proceeded to Bergen to take up work in other areas.

b) Biological statistical work was undertaken on similar lines as in previous years on the cod and herring. A report by Mr. Lea has appeared in the Fishery Director's

Report, giving an account of his latest results regarding the observations for a number of years. A cruise to the spawning areas of the herring was conducted by Mr. Lea in March 1928 with the purpose of searching for and eventually studying the herring ova deposited on the bottom. The ova were located and it was established that a high degree of mortality took place even before the hatching of the eggs. The Fishery Director's Report contains an account by Mr. Sund on the stock of cod in 1927 which was characterized by the predominance of the rich year class 1919 as evidenced both by scale readings and by the numerous measurements arranged so as to show only percentages of each centimeter class referred to the average number in each class during the years 1913—1925. A diagram showing a graphical representation of all Norwegian cod measurements from 1913 up to 1927 is reproduced in order to show the possibilities of the method in demonstrating the irregular renewal of the stock. It is much to be desired that also trawled cod from the Barents Sea should be regularly measured in order to gain a complete yearly survey of the entire Arcto-Norwegian stock of cod. Work on similar lines on the cod is now about to be taken up in Iceland and in the Faroes, and the time may not be distant when also the stock of cod in American waters will be subjected to analysis by measurements, although the fluctuations, and accordingly the importance of the work, are much more prominent in Europe.

A report by Mr. Paul Bjerkan on his researches on the sprat in 1927 will shortly be printed in the same publication (Aarsber. vedk. N. F.). The main features of the Norwegian coast sprat in 1927 were: 1) The preponderance, in most cases absolute, of the one year old fish; this seems to be the normal constitution of the sprat shoals, seasons dominated by two year olds being exceptional. 2) The size of the fish was mostly above the normal, everywhere in the districts north of Bergen while shoals of comparatively small one year old fish occurred occasionally in the southern fiords. — Continued scale measurements tend to establish that as a normal occurrence two distinct sizes of sprat fry combine in forming the sprat population of the coast, the one averaging in that year 6 cm and the other 7 cm. The sprat shoals in the northern districts, which seem to come directly from the sea into the fiords, consist exclusively of the larger fry, while the varying size farther south is explained by the difference in size of the fry forming the shoals which migrate into the southern fiords. A great number of vertebral counts have been made and they show that the Norwegian coastal sprat has 0.3 to 0.4 vertebrae less than is found in samples from the southern North Sea (Lowestoft and Ostend). Fish from a landlocked basin ("poll"), however, show most extraordinary vertebral numbers, in old fish the high average of 48.23, while the younger had only 47.57. This find seems to indicate a lesser value of the vertebral number as a racial character than is generally assumed.

c) A marking experiment with spawning cod was undertaken by the Director of Fisheries and was conducted by Mr. Edv. J. Havnø at Myken, a fishing place near the Polar Circle, in March. One thousand fish were liberated and the percentage of recaptures was up to the end of 1927 3.4 per cent., most of the recaptures being in the vicinity of the place where the fish were set free, but a few had gone north, even to the eastern-most part of Lofoten, probably crossing the West Fiord, while a few fish had ventured

in a southerly direction and were taken as far as 60 km. south of Myken. A report by Mr. Havnø is published in the Fishery Director's Report for 1926—27.

A final report on the marking experiment with plaice in the Lofoten waters in 1924 and 1925 has been worked out by Mr. Paul Bjerkan (Aarsber. vedk. N. F. 1927, nr. 1). In 1924 206 plaice were marked and up till now 19 have been returned; for 1925 the equivalent figures are 516 and 150, — i. e. 29 per cent. recaptures. Most of the fish were retaken at some small distance from the place of liberation but only 20 to 25 per cent. had strayed farther than 10 km. Of these a great proportion have rounded the southern point of the Lofoten group, (most of the fish were set free on the NW. side) and were recaptured late in the winter on the east side of Lofoten. The interest of these recaptures is accentuated by the circumstance that they were made by means of cod gill nets and not with the proper plaice gear (Danish seine) which is prohibited in that season. Therefore even these few recaptures may be taken as strong evidence for a pronounced migration towards deep water during winter.

Germany

The investigations made in August and September 1927 in the Barents Sea by means of the Reichsforschungsdampfer "Poseidon" are to be regarded as a continuation of the work begun in 1913 and recommenced in 1926.

The aim of the expedition was above all to make a synoptic survey of the hydrographic conditions of the Barents Sea over as large an area as possible.

According to a plan which was to be carried out in common with Russia the German expedition made six sections from north to south from the coast towards the drift ice limit, viz.:—

Average Long.	19° E.	up to Lat.	76° N.,	end of July.
—	—	26° E.	—	—	76° N.,	end of July.
—	—	30° E.	—	—	75°30′ N.,	beginning of August.
—	—	33°30′ E.	—	—	76°45′ N.,	in mid-August.
—	—	38° E.	—	—	77°45′ N.,	end of August.
—	—	30° E.	—	—	76°30′ N.,	beginning of September.

while the work in the easternmost part of the Barents Sea towards Novaya Semlya was allotted to Russia.

The sub-surface observations on these sections were made at stations lying 30′ apart, the surface observations being more densely spaced.

Apart from the hydrographic work, plankton samples were obtained from the surface, and at selected stations also from deeper layers. The samples were preserved for later examination of the nannoplankton.

Fishery-biological investigations were also carried out, and from nearly all stations bottom samples were obtained.

On the Spitsberg Bank and to the West of the Lofoten fishery research of a more specialised nature was carried out.

Visits were made to the Biological Station at Alexandrovsk on the Murman coast and to the Safe Bay in Ice Fiord, Spitsberg.

Finland.

Biology.

Investigations of the coastal plankton, the littoral and sublittoral fauna and the vegetation of marine algae have been made off the Petsamo coast of the Barents sea.

Sweden.

An expedition was made in August to the west coast of Norway in the research-ship "Skagerak" with the object of making plankton and hydrographic investigations from the Norwegian coast and out beyond the area of the Gulf Stream in collaboration with Professor Johan Hjort. A section was placed from the Romsdal Fiord and a distance out into the Norwegian Sea with numerous plankton and hydrographic stations, and another hydrographic section across the Norwegian Channel in the latitude of Egersund.

Current meters were also laid out to measure the currents along the Norwegian coast.

Denmark.

Professor Dr. Johs. Schmidt, Carlsberg Laboratory, has received and investigated samples of cod collected by the Norwegian Fishery Department at Lofoten and Finmark.

NORTH-WESTERN AREA
1927.

By
Johs. Schmidt.

The following work has been carried out in the North-Western Area during the year 1927 by the different countries:

Denmark.

In the course of the spring months March—May, 383 cod were marked and liberated in the waters to the north of the Faroe Islands. At the same time copious data derived from cod measurements and otoliths were collected as a link in the projected continuous investigation of the fluctuations in the cod stock.

The research vessel "Dana" left Copenhagen on June 12th and was used for investigations at Faroe and Iceland for the three following months.

As in previous years, hydrographic and biological investigations were carried out both in the North Sea and in the Faroe-Shetland Channel, as also on the voyage to and from the Faroe Islands. It proved impossible to find *Leptocephalus brevirostris*, *Salpa fusiformis* or other organisms of pure Atlantic origin, which had been found for instance the year before (cf. Johs. Schmidt: Eel larvae in the Faroe Channel, Journ. du Cons. Vol. II, p. 38, 1927). This was undoubtedly due to the great difference in the temperature for the two years, the surface water on Sept. 5th 1927 being 11.20° C. ("Dana" St. 3347) whilst in the previous year at about the same place it was 13.58° C. ("Dana" St. 2998).

In the Faroe waters, the investigations from previous years were continued both in the fjords and on the coastal slopes of the islands.

The cod otoliths collected during the spring fishing and also during the investigations carried out from the "Dana" were worked up in the course of the year by A. Fr. Bruun, M. sc. The provisional results show that the growth of the cod in the Faroe waters may be described as rapid, since they already at an age of four winters have attained a length of 60—70 cm., which is about the same as that attained by cod in the waters to the south and south-west of Iceland at the same age (cf. B. Sæmundsson, Medd. Komm. f. Havundersøgelser Vol. VII, Nr. 3. 1923).

The most important year classes for the fishery were in 1927 the III—VII-groups, and of these it was the IV-group, which was especially predominant off Suderø where it constituted 47 per cent. of the catch, whilst in the sea to the north of the islands it constituted 33 per cent.

Material collected for the valuation of the sea-bottom together with the material from 1926 is being worked up by Dr. R. Spärck and will be published shortly.

Upon an expedition to the Faroe Bank, a I-group of cod was proved to be present at a depth of more than 100 metres. A racial investigation carried out later has plainly confirmed the view previously held, that the cod stock of the Bank is self-contained and that no material exchange takes place with the populations of the surrounding coastal areas.

In addition to the racial differences the cod stock of the Faroe Bank is remarkable for the unusually rapid growth of the fish. During the first year they do not grow any more rapidly than the cod on the coastal banks, as in June 1927 they had an average length of about 20 cm., but already in their third year, i. e. as II-group, they have an average length of about 55 cm. and this exceptional growth continues in the III- and IV-group up to sizes of about 74 and 85 cm. respectively.

This great rate of growth, which is certainly the greatest which has up to now been found in any stock of cod, affords no doubt an explanation of the view generally held that the quality of the Faroe Bank cod is quite unusually good.

A series of trawlings was carried out off Iceland, both inshore and on the coastal banks further out both within and outside the territorial limit; off Ingolfshöfdi within and outside the limit were marked and liberated 114 and 135 plaice respectively and in Faxe Bay 231 in each case.

Pelagic fishing experiments for fish larvae were carried out parallel with hydrographic observations during the circumnavigation of the island.

The attempt is made in these researches to investigate as far as possible the same hydrographic sections from year to year in order to obtain in time a general picture of the conditions; as an instance may be mentioned that from observations made for several years it has been shown that at midsummer a layer of water of high salinity (exceeding 35 per mille) penetrates in between the water-layers off the north of Iceland; this layer on July 15th off Siglufjord extended from a depth of 50—100 metres below surface down to about 200 metres. All the hydrographic material has been published in Bull. hydr. trim. Nr. 3, 1927.

The general distribution of the fish larvae was on the whole in accord with that observed in previous years, which shows that the stocks of cod, haddock, plaice, and some other to the north and east of Iceland are recruited for by far the greatest part from fry spawned in the south and west and brought from there round the western side of the island by the ocean currents.

The very comprehensive material which has been collected systematically for several years for the purpose of illuminating the conditions of life of the plaice in Icelandic waters has been worked up in the course of the year by Å. V. Tåning, M. sc. and will be published before long. These investigations are concerned with growth of plaice and the fluctuations in their different year classes.

It has been shown for instance that the average size of a single year class can differ widely (up to about 11 cm.) in different places; the regular fall in the mean length of a year class which one finds as one sails for instance from the south of Iceland past

Ingolfshöfdi towards the north shows that the temperature is undoubtedly the factor that determines this.

Finally the fluctuations of the year classes are found to be very appreciable; as a very illuminating example may be mentioned the fact that in a single catch of about 700 fish, of which about 650 exceeded 20 cm., a single year class, the III-group, constituted 97 per cent. of the whole.

In recent years, the year classes 1920 and 1922 have especially proved abundant, and 1924 promises to become so; as regards all three year classes there is a striking accord with the fluctuations of the year classes in the North Sea.

The investigations set on foot in 1926 along the north coast of Iceland into the stomach content of herring in relation to the quantity of plankton and its composition (see Rapports et Procès-Verbaux XLI, p. 150) were continued by Dr. P. Jespersen during the period July-September 1927. Plankton samples were collected from the "Dana", but the investigations were carried out chiefly by equipping a number of fishing vessels with plankton bags and jars for preserving herring stomachs. Where large quantities of herring were encountered, plankton hauls were made from the vessels and the stomachs taken out of a number of herring captured on the spot.

A provisional examination of the material collected seems to show in the main a close agreement with conditions in 1926, but *Calanus finmarchicus* and the spawn of Euphausids appear to predominate in the food of the herring to a still greater extent. This is so, however, chiefly in the case of herring which are captured in purse-seines and consequently in the upper water layers. The spawn of Euphausids constitutes by far the most important food in the case of herring captured in drift nets, in whose stomachs as a rule far less is found than in those of herring captured in seines, and this is due presumably to the former being caught at greater depths than the latter, namely at about 15—25 metres below the surface.

A more special investigation has been commenced, into the phenomenon "Grönaat-herring", i.e. herring which after having been salted for some time display a conspicuous dark greenish blue colour in the flesh and are therefore practically unsaleable, but it has not yet led to a satisfactory result.

The material relating to cod which was collected by the "Dana" has been subjected to investigation with special reference to the fluctuations of the year classes; it is intended, however, to resume these investigations on a broader basis in the spring of 1928 by collecting material during the great fishery of the spawning stock off the Vestman Islands and by then following the fishing fleet northwards and westwards round Iceland.

Moreover Bjarni Sæmundsson, fishery consultant, has collected a large material of cod otoliths (without measurements) to form a provisional estimate of the age distribution amongst the fish caught with hand-lines and gill-nets during the spring fishery off Grindavik (South Iceland) and to be used in a projected investigation into the occurrence of the Icelandic cod's good and bad survival years.

Racial investigations of cod have been continued not only with reference to the cod from Iceland and Faroe, but from practically the entire area of distribution off the shores of the North Atlantic Ocean.

Extensive age determinations have been carried out by the aid of otoliths on the cod samples used for the racial investigations.

The marking experiments with cod off West Greenland have been continued, 201 fish having been marked. Since 1924, 1367 in all have been marked and liberated; of these only a very small proportion have been recaptured, namely 47 fish in all, and similarly migrations of any importance have only been found to take place to a very small extent nor in particular has there been any exchange with the American or Icelandic or East Greenland cod stocks.

Finally hydrographical observations have been made from the Danish inspection vessels "Fylla" and "Islands Falk" in continuation of those made from the "Dana" at the fixed stations off Akranes and off Garðskagi, which were commenced in 1924 and 1925 respectively. The Icelandic inspection ship "Thor" has similarly during the winter recorded observations at these two stations.

In continuation of the Danish investigations regarding the quantity of fish within and without the territorial limit in Faxe Bay, a series of trawlings has been carried out from the Icelandic inspection ship "Thor" in the months of March, April, and October under the direction of the Icelandic fishery consultant Bjarni Sæmundsson. These trawlings are of particular interest, supplementing as they do the investigations carried out from the "Dana" exclusively in the summer months.

Germany.

Data derived from the examination of Icelandic fish have been collected by German investigators in connection with Fischereibiol. Abteilung at Hamburg on board of commercial trawlers from the river Elbe. These data consist of a number of separate analyses of stomach contents of cod, haddock, whiting, and saithe taken in April 1924, and of observations on the composition of the catch on different trawling grounds near the South coast of Iceland concerning the varieties of species caught, their sizes and their stomach contents in July 1927.

Scotland.

1) Hydrographical observations in the Faroe-Shetland Channel, at Faroe, and between Faroe Bank and the Butt of Lewis during August.
2) Trawling observations on the Faroe fishing ground and on Faroe Bank during August. Fish measurements and otolith collections.
3) Trawling observations on the grounds west of the Butt of Lewis in May and August.
4) Collection of samples of cod from the West of Scotland for racial investigations.
5) Collection of general statistics from Faroe and Iceland.
6) Completion of analysis of Icelandic haddock data for publication by Dr. H. Thompson.

PLATEAU CONTINENTAL ATLANTIQUE
1927.

(Atlantic Slope.)

Par

Ed. le Danois.

Au cours de la séance tenue le 26 Mai 1927 à Stockholm, le programme général du Comité a subi quelques altérations qui ont été succinctement indiquées dans le dernier fascicule, contenant les recommandations de la réunion jubilaire du Conseil.

Il me paraît utile de rédiger ci-dessous, l'ensemble de ce programme.

1) En vue de continuer l'étude des conditions hydrographiques et biologiques du Golfe de Gascogne, des croisières périodiques trimestrielles seront effectuées par les gouvernements de la France, de l'Espagne et de l'État libre d'Irlande, dans les conditions suivantes:

Espagne: 8° W. G. de la côte jusqu'au 47° N.
47° N. entre 8° W.G. et 9° W.G.
9° W.G. du 47° N. à la côte d'Espagne.
France: d'Ouessant au 9° W.G. (49° N.)
9° W.G. du 49° N. au 47° N.
du 47° N. (9° W.) à Ouessant.
Irlande: 8° W.G. de la côte au 49° N.
49° N. entre 8° et 9° W.G.
9° W.G. du 49° N. à la côte d'Irlande.

Ces croisières seront effectuées aux mois de Février, Mai, Août et Novembre.

A chaque sortie, une ou plusieurs stations comprendront des observations en eau profonde; si possible de la surface au fond, en dehors du Plateau continental. Les sorties seront utilisées pour des pêches planctoniques à l'aide du filet vertical.

2) L'étude de la Manche Occidentale sera faite par les soins du Gouvernement de Grande-Bretagne sous forme de croisières périodiques, exécutées par le navire de la "Marine Biological Association".
3) L'Etat Libre d'Irlande exécutera des croisières au Sud-Ouest de cette île afin de préciser la position de la ligne iso-haline 35,5 $^{0}/_{00}$.
4) Les études du Comité s'étendent au Sud dans les régions de Madère, des Açores, des îles du Cap Verde et des Canaries, en relation avec le nouveau laboratoire espagnol de ces dernières îles.
5) Le Portugal et l'Espagne feront un accord pour une étude combinée en baie d'Espagne. MM. Rafael de Buen et Ramalho sont désignés par le Comité pour cet accord.

6) Les recherches dans le détroit de Gibraltar seront effectuées en accord avec celles de la Méditerranée.
7) Les études sur le Merlu, le Thon rouge, le Germon, la Sardine seront continuées sous leur forme actuelle, en tenant compte particulièrement des dates et lieux de ponte de ces poissons et de la différenciation des races locales.
8) L'étude des races de hareng sera continuée en Manche Occidentale et dans la région Sud-Ouest des Iles Britanniques.
9) La méthode des statistiques biologiques sera appliquée dans une très large mesure à toute question étudiée par le Comité.

Tel est actuellement le programme du Comité du Plateau Continental Atlantique.

La majorité des points de ce programme a fait l'object d'étude spéciales dont la plupart ont pris place dans des publications nationales.

En ce qui concerne les croisières, le tableau ci-contre indique par mois et par pays les sorties effectuées par les navires de recherches dans le secteur du Plateau Continental Atlantique. Il peut se résumer comme suit:

Angleterre: Sorties périodiques mensuelles du navire H.M.S. "Salpa" (hormis janvier et juillet).
Irlande: Sorties du navire "Muirchu" en février, mai et novembre.
France: Sorties périodiques des cannonières de la Marine Nationale, en février, mai et août.
Croisières des navires "Estafette" et "Sentinelle" de la Marine Nationale en mai.
Croisières du chalutier "Tanche" en août.
Espagne: Sorties périodiques du navire "Eduardo Dato" en mai, août et novembre.
Portugal: Sorties du navire "Albacora" en mai, juin et en juillet—août.

Il apparaît du tableau et de l'exposé ci-dessus que chacun des trois Etats intéressés dans les croisières périodiques trimestrielles a fait son possible pour réaliser le programme donné, mais par suite de difficultés d'ordre intérieur, seule la croisière de mai a été régulièrement exécutée. En effet, l'Espagne en février, l'Irlande en août, la France en novembre, n'ont pu faire sortir leurs navires aux dates prévues. Il en résulte une discontinuité dans les documents recueillis et une grande difficulté dans leur interprétation.

Les résultats des recherches du navire portugais ont fait déjà l'objet d'une note publiée dans les travaux de la Station de Biologie Maritime de Lisbonne; mais étant donné l'interêt de ces travaux je crois bon de les reproduire en langue française dans le prochain Rapport Atlantique.

Les croisières de l'"Albacora" ont, en effet, marqué l'activité du Comité dans le Secteur Sud.

Dans une étude qui figurera également dans ce Rapport Atlantique, M. le Professeur Rafael de Buen a résumé les conditions générales de l'hydrologie du sous-secteur dont il a la charge en qualité de Vice-président.

J'y ajouterai un court rapport sur les conditions physico-chimiques du Secteur

Nord en 1927, en annexant un résumé de la croisière de la "Tanche" sur les fonds du Plateau Continental Atlantique par M. Belloc, Chef de Mission.

Enfin, je tiens à signaler que les études biologiques sur la Sardine ont été poursuivies en France, en Espagne et en Portugal avec une grande activité, par MM. Fernando de Buen, P. Arné, J. le Gall et A. Ramalho.

1927	Angleterre	Irlande	France	Espagne	Portugal	
Janvier	....	....	....	....	....	....
Février	Salpa	Muirchu	Vaillante	....	....	sortie périodique
Mars	Salpa	....	.. ..	....	....	....
Avril	Salpa	....	....	....	....	....
Mai	Salpa	Muirchu	Surveillante Estafette Sentinelle	Eduardo-Dato	Albacora	sortie périodique
Juin	Salpa	....	....	....		....
Juillet	....	....	....	....	Albacora	....
Août	Salpa	....	Tanche Arras	Eduardo-Dato		sortie périodique
Septembre	Salpa	....	....	....	....	....
Octobre	Salpa	....	....	....	....	....
Novembre	Salpa	Muirchu	....	Eduardo-Dato	....	sortie périodique
Décembre	Salpa	....	....	....	....	....

COMBINED NORTH SEA
1927.

By

David T. Jones.

As indicated in the subjoined Reports of the Northern and Southern North Sea Committees, the year 1927 has been one of continued co-operation between the two Committees, which in the large and important area entrusted to them are faced with many common problems involving joint effort and consideration. The researches, which have been conducted on approved lines, were fortunately free from the interruptions experienced in the previous year and considerable progress in the work is recorded. It is satisfactory to note, so far as the Northern area is concerned, that, whereas for last year reports were received from France and Scotland only, reports are to hand this year from Denmark, France, Germany, Scotland and Sweden.

NORTHERN NORTH SEA

By

A. Bowman.

At the previous meeting of the Committee the continuation of the programme of researches was affirmed.

The investigations for the year have been concerned mainly with the herring and haddock and with the hydrographical and planktonic conditions of the area. Other species such as plaice, lemon sole, and witch have also been the objects of investigation and experiments with different types of trawling gear have been carried out.

The following is a resumé of the work carried out by the participating countries.

Denmark.

Hydrographical and plankton observations were carried out by the Research Steamer "Dana" at a series of twelve stations on her passage to Iceland in June.

The larval herring and haddock material has been placed at the disposal of Scotland.

Racial investigations have been made on the cod and plaice of the West Coast of Scotland.

France.

During the whole of the herring fishing season in the northern North Sea the Protection Steamers "Sentinelle" and "Estafette" commissioned for the protection of the fisheries continued their oceanographical observations according to the programme previously determined.

Nine oceanographical stations were examined in the region from July 16th to August 22nd, 1927, temperature and plankton observations also being taken. These observations were made chiefly in the locality of the drift net herring fleet, and at the same time all meteorological conditions likely to influence the catches were also noted.

The fluctuations of the fishing in the principal areas frequented have been observed and samples of herring taken at each locality have been studied with respect to size, sexual maturity and physiological condition.

Observations on the presence of the tunny on the herring fishing grounds in the northern North Sea were carried out during the whole of the season. During the summer of 1927, tunnies were much less abundant than in 1926, in this part of the North Sea.

Germany.

The "Fischereibiologische Abteilung des Zoologischen Staatsinstituts" in Hamburg has been specially engaged on investigations on the herring and has carried them on systematically during the year reported on.

1) Statistics of the catches of trawled herring by German steamers were compiled with respect to the size of the catches, the positions of capture, the ports of landing etc. and a preliminary report was published in the "Fischerbote" (1928. Heft I). In this journal, statistics of the extent of the German drift net fishing in the North Sea were also given. Tabulation of the German drift net fishing grounds according to intensity of fishing and yield of the catches was carried out, based on numerous daily records of catches which were obtained during the season 1926 from the Lugger Companies and in which each individual catch was described according to its size, composition and locality and published in 1927 (Ber. d. D. Wiss. Komm. III. S. 306) and this will be continued in future. In addition, the data for this were collected for season 1927.
2) Regarding cruises to the herring grounds only one need be mentioned which was undertaken on board the Fishery Protection Vessel "Zieten" from the 13th August to the 7th September and was carried out on the herring grounds of the Fladen and Dogger Bank.

   A general report on the German Trawl Herring Fishery, its development, its significance, and the study of its basis was given in the Journal du Conseil (Vol. II, p. 113).
3) A large number of herring samples was analysed in the Laboratory, determinations of length and weight, as well as of sex, maturity and age (principally by means of otoliths) being carried out. The samples were procured partly from trawl and drift-

net fishermen, partly through the agency of the laboratories in Aberdeen and Lowestoft and to a large extent from the markets of Altona and Hamburg. They were almost without exception used also for the racial investigations mentioned below.

During the working up of the material mentioned above, attention was chiefly directed to the composition of the herring stocks, to their rate of growth and to the annual fluctuations observed in this connection in order to get some basis for the prediction of the productivity of the fishing in future years (cf. publications in Ber. d. D. Wiss. Komm. III., S. 47 and Fischerbote 1926, S. 495 u. a. a. O.).

4) The study of herring larvae from former catches made by the "Poseidon" was continued along with observations on their occurrence, sizegroups and associations with other fish larvae.

5) Very exhaustive investigations have been carried out on the races of herring and these have been in part already published (Ber. d. D. Wiss. Komm. III. S. 95). Almost all the herring samples which were at our disposal were examined, if they were large enough. These were chiefly herrings of the western North Sea, from the Shetlands, Fair Isle, Fladen Ground, Gut, Brucey's Garden, Dogger Bank, Lowestoft, Sandettie, and also from Aalesund (Norway), Viking Bank, Skagerak and the Elbe, as well as from Plymouth, Fleetwood, and north Ireland. This work is still proceeding.

6) With regard to the investigations on the animals which serve as food and on the feeding habits of the herring, plankton samples in the form of serial hauls have been taken during recent years from the "Poseidon" and the Protection Steamer "Zieten". These were distributed as far as possible over different hours of day and night so as to make it possible to follow the vertical movements of the most important plankton organisms under the influence of light and to determine how far the herring themselves in their vertical movements are dependent on the behaviour of certain constituents of the plankton.

In addition collections from the upper water layers of the North Sea (down to depths of 32 m.) have been specially investigated and enumerated, as it has already been shown that collections from medium depths (down to 100 metres) and from greater depths (more than 100 metres) are really differently constituted and therefore have to be considered differently and that an exhaustive study of the latter is indispensable for the understanding of the associations here concealed and is therefore of no less importance than the study of the upper water conditions.

Nothing has so far been published on this part of the investigations, but some instalments of the observations on the components of the food of the herring are already in print (Ber. d. D. Wiss. Komm. I. S. 199).

Scotland.

The Research Vessel "Explorer" was kept in commission for the greater part of the year. The following is a brief outline of the cruises accomplished and the main objects of each cruise.

1) January: The distribution and size frequencies of the young year classes of the spring and autumn spawning herring occurring in the Firth of Forth.
2) January—February: Trawling survey of the Firth of Forth and the inshore grounds east of Scotland.
3) March: Trawling survey of the north-western area. Sampling of the haddock grounds during the spawning season.
4) March—April: Trawling survey of the Shetland grounds. Hydrography of the Fair Isle passages. The incidence of occurrence of the progenies of the autumn spawned broods of herring in the Firth of Forth area. Plaice marking experiments on the inshore areas of the east coast of Scotland.
5) May: Trawling, hydrographic and planktonic survey of the north and west coasts of Scotland. The trawling experiments were focussed on the haddock and observations were extended to the Firth of Clyde.
6) June: Comprehensive hydrographic survey of the northern North Sea. Observations were carried out along four parallel lines of stations as an extension of the series of observations carried out by the Ministry of Fisheries (England) in the southern North Sea during the same period.
7) July: Plaice transplantation experiments from the inshore waters of the east of Scotland to Shetland. Trawling observations at Shetland. Hydrographic survey of the Fair Isle passages and of the Faroe-Shetland Channel.
8) August: Trawling experiments at Faroe and on Faroe Bank. Hydrographic section between Faroe Bank and Butt of Lewis.
   Trawling observations in the Minch and on the north-west coast.
9) September: Biological survey of the west coast of Scotland. The observations were extended to the Firth of Clyde and Luce Bay.
   Plaice marking experiments in Luce Bay.
10) October: The distribution of larval herring in the north-western area of the North Sea. Trawling experiments and plaice marking on the inshore areas of the east of Scotland.
11) October—November: The distribution of larval herrings on the grounds east and south-east of the Firth of Forth as far as the Dogger Bank.
   Trawling observations and plaice marking experiments on the inshore grounds.
12) December: Trawling survey of the Moray Firth grounds and of the north-western area as far as Lerwick and Foula.

During part of April the motor-boat "Enid" co-operated with the "Explorer" surveying the conditions with regard to the occurrence of the spring and autumn spawned broods of herrings in the upper reaches of the Firth of Forth.

Herring.

The captures of herring larvae during the year under review were more numerous than in any of the years during which plankton observations have been made. A considerable amount of attention was given to the occurrence of the larger larvae and to better methods for capturing these active stages. The capture of large larvae of autumn incidence in process of metamorphosis has been a pronounced feature of the recent investigations and data are being gradually accumulated of the Scottish herring at this stage.

The material collected during the year comprises approximately 100,000 larvae and early adolescent stages ranging in size from 6 to 70 mm. in length and consists largely of the smaller sizes less than 20 mm. in length. A study of the herring larvae from catches made in earlier years has been completed and the report is now in the Press.

Various features regarding the manner of dispersal of the larvae still remain obscure. In considering the positive records from Shetland waters for all years during which investigations were made in that area the total number of larvae is remarkably small. Within the deeper area between the Shetlands and the Norwegian Deep considerable numbers of spring larvae have been found most of which undoubtedly originated from known spawning grounds along the western side of the Norwegian Deep, but it is possible that a small proportion of the larvae may originate from the prolific spawning grounds to the north-west of Shetland.

In the north-eastern area however to the north of Bressay Shoal there is a comparative absence of autumn larvae except for a few odd larvae in the region of Unst Bank. The poverty of the material from the Shetland area in the autumn months, when frequent observations have been made there, is striking. While the Shetland area is remarkably weak in representation of the autumn brood the frequency numbers of larvae increase immediately to the southwards. These larvae are dispersed along the Scottish East Coast but there is evidence of an easterly trend towards the south-western margin of the "Fladen Ground" and over the "Long Forties" to the northern entrance to the "Gut" and even as far as "Ling Bank" but so far as Scottish investigations show the number of larvae decreases rapidly in an easterly direction. South of the "Long Forties" the south-easterly dispersal through the "Gut" appears to be of some magnitude. The larger larvae however do not appear on these offshore grounds until October.

The weak link in the chain of observations lies in the absence of sampling to the east and south of the "Gut" during the late autumn and winter months. Investigations between the Firth of Forth and Dogger Bank have been extremely limited but although they have taken place from September to November in earlier years they have not quite succeeded in clearing up the question of the dispersal in a southerly direction of larvae originating from localities off the East Coast of Scotland. With a view to elucidating this aspect of the problem a cruise was undertaken to the Dogger Bank in November but the prevailing hydrographic conditions were such as to preclude a southerly or south-easterly dispersal of any magnitude. Evidence of a reversal of the currents in the area was obtained from the return of drift bottles though the uniformity in size of the herring larvae in the Forth and Dogger regions was also suggestive of unusual conditions.

During 1927 samples of herring from commercial drift net catches were examined periodically although on a less extensive scale than in previous years. Particular attention was given to the catches of trawlers and steam liners fishing for bait made outwith the normal period of the herring fishing or from grounds beyond the range of the drifter fleet. Extensive observations on the degrees of maturity of the adult shoals on the offshore and inshore areas have been carried out during the progress of the fishing with a view to tracing the movements of the fish towards the spawning grounds.

Racial investigations are in progress on two large samples, one from the Firth of Forth spring spawners and the other from the autumn spawners of the East Coast of Scotland.

Haddock.

In recent years attention has been directed to the problem of the interpretation of current events in the Haddock Fisheries of the North Sea. It has been shown that by far the most productive line of attack is the tracing of the life histories of the individual age groups and that this can be achieved satisfactorily only by the systematic division of the total catches into the constituent year classes of haddock. The ability to do this is in turn very largely dependent upon the collection of numerous and representative scale samples in order that age determination may be exact.

As the methods in use have been applied over a period of some six years the results up to date have been reviewed by Dr. Thompson and are presented to the Committee for consideration.

The existence of differing growth rates of haddock in the North Sea raises the question of the food supply available in the different areas. The study of the chief species of animals occurring in the stomachs of haddock is in process with its chief objects the determination of the time of year and localities of occurrence of these species, together with their relative importance by volume and nutritive value in the diet.

Marking Experiments.

During the year 5541 plaice, 1053 lemon soles, 305 skate, 220 haddock and 300 cod were marked and liberated. Recaptured fish returned to the Laboratory during the year numbered 1672. Of the total 1420 were plaice and 162 lemon soles. With regard to the plaice marking experiments two main objects have been kept in view, firstly, to determine the migratory movements of plaice in areas outwith the North Sea and secondly to ascertain the rate of depletion of the stock of plaice inhabiting the coastal waters of the East Coast of Scotland.

In addition, 885 marked plaice were transplanted from the East Coast of Scotland and liberated in Shetland inshore waters.

Hydrographic and Plankton Investigations.

In all 2131 observations of temperature were recorded and 2109 samples of sea water from various depths were collected for salinity determinations. Established lines of hydrographic stations were visited as frequently as was found practicable, the stations forming such a section to the east of the Orkney and Shetland Islands receiving most attention throughout the year.

The liberation of surface and bottom drift bottles was continued. In respect of surface bottles set adrift in the North Sea information of importance on its bearing on plankton investigations resulted from those liberations effected during the month of November off the mid-East Scottish and the Northumberland and Durham coasts. Within eight days it was revealed by the recovery of two drifters from the coast of Northumberland that at this period the drift of at least the surface coastal waters off the north-eastern English coast was northwards. Twenty days later it was known that this set of the coastal waters northwards extended as far as Buchanness at least.

Extensive plankton collections were made on all the periodic cruises, special attention being given to the main spawning areas of the herring and haddock and the dispersal of the young therefrom.

The investigations of the stomachs of herring for food contents have been linked up with the plankton observations. Considerable advance has been made with the study of the problems surrounding the abundance, movements and life-history of *Calanus finmarchicus* within the area.

Larval hake appeared in the plankton collections during August, September and October, but the numbers were never considerable, the largest larva having reached a length of 22 mm. at the end of October. The collected records of hake larvae within the North Sea for all the years are by no means numerous. The larvae occur from July to November and are confined almost entirely to the Moray Firth though a few are found south of Rattray Head and along the East Coast, but no records have been got so far south as the Firth of Forth or east of the Greenwich meridian in the region of the "Long Forties".

Sweden.

In July a cruise was made to the North Sea especially for investigations on the witch (*Pleuronectes cynoglossus*). The main purpose was to survey the spawning places of the species, to collect material for a study of the rate of growth, to ascertain the distribution of eggs and larvae, and to make marking experiments.

The investigations were concentrated on the region comprising the Ling Bank, Fladen Ground, Bressay Shoal, and the north-western part of the North Sea off Shetland. It was ascertained that the witch was spawning over a very extended area. The most important spawning places seem to be situated on the Fladen Ground and in the northern part of the North Sea, on the Bressay Shoal and in the area off Shetland in a depth of 120—150 metres.

A total of 550 specimens were marked during the cruise.

In addition extensive plankton collections were made over the area of the cruise. In some places larvae of the witch at different stages of development were common.

A large number of otoliths was collected.

Hydrographical observations were made in combination with the fishing experiments. The hydrographical data were submitted in the prescribed tabular form for publication in "Bulletin Hydrographique Trimestriel".

SOUTHERN NORTH SEA

By

J. O. Borley.

Preliminary.

The year 1927 was an active period for the laboratories, ships and men engaged in the investigations with which the Southern North Sea Committee is concerned. The Research Vessels "Augusta", "Georg Bligh", "Dana", "Oithona" and "Poseidon" were

in commission, though unfortunately not all these ships were employed continuously in the area. Owing to the interest of Scotland in the haddock and the herring, which respect no boundaries, the "Explorer" made a welcome incursion into the Southern North Sea. In addition all the countries represented obtained valuable information, not merely of a statistical character from commercial vessels. These vessels were utilised for the collection of biological and hydrographic material, for observations on the catch by members of the scientific staffs, and, particularly in the passenger vessels and light ships helping in the hydrographic work, for the actual carrying out of the collection and the keeping of records. Very valuable assistance was rendered also by the Navies of the countries concerned: much of the French work was carried out from the cruiser "Quentin Roosevelt", and the patrol vessels "Sentinelle", "Estafette" and "Caliorne", the same may be said of the German patrol vessel "Zieten", while the assistance of H.B.M.S. "Godetia" and "Garry" alone rendered it possible for England to undertake the network of hydrographic cruises which covered the area in June.

Space does not permit of detailed mention or acknowledgement: the Committee is greatly indebted to the officers and crews of all ships whose help has done so much to further the investigations.

It was said in the last report (Rapp. et Proc.-Verb. XLV, 1927, p. 124—125) that in 1926 great attention had been paid to the study of fluctuations in the stock. This subject has steadily developed during 1927, and the following pages show that the fluctuations of many species of food fish are now under observation. The establishment of reliable methods of age determination have given to the conclusions of these studies a confidence that otherwise it would be impossible to attain. It should be remembered however, that fluctuations in supply are subject not merely to changes in natural conditions but to the effects of fishing. For a satisfactory knowledge of the fisheries and their prospects it is essential that comprehensive and reliable statistics collected on a uniform plan should be built up; and it is most desirable that every effort should be made to reach a common high level in this branch of the work.

For the rest, the year's work has been marked by the number of different investigations simultaneously carried out. It can be confidently expected that as the many lines of work develop they will be found more and more to afford each other mutual assistance.

Fish.

General.

Statistics and Ichthyometrics. The collection of this information has proceeded without change of method.

In addition to the species which have occupied the attention of the English fish measurers as a rule during the last few years, soles and turbot have received some attention, and it is intended that measurements of these fish shall continue to be made. The numbers of the chief species measured during 1927 were:—

At sea				On the markets			
Plaice	Haddock	Cod	Total of all species	Plaice	Haddock	Cod	Total
556,809	557,693	48,321	1,171,131	59,478	26,284	5,727	91,489

Total			
Plaice	Haddock	Cod	Total of all species
616,583	583,977	54,048	1,262,620

Considerable attention was paid during the year to the measurement of samples of the various market categories of plaice, in order to assist in the interpretation of the trade classes which are distinguished in the statistics of the landings. As during the previous year, all haddock measurements were put at the disposal of the Scottish Department.

German investigators have measured 48,855 fish in all, mainly flat fish including 17,853 plaice.

Naturally other measurements of large numbers of fish have been made in the course of the various investigations, but the above summary appears to cover all the measurements carried out on a large scale and as an object in themselves.

Food of Fish. Much attention was given during 1927 to the food of herring. A mass of material was collected and progress made with its examination. Mention of this, however, can be made more conveniently in reporting on that fish. In regard to general investigation of the food, in Germany attention was devoted more to the examination of material already amassed than to the collection of additional material. The food eaten was studied in its relation with the benthos present, by the quantitative methods described by Dr. Hertling in his work on these matters in the Baltic. Work has been carried out also on the food values of the chief species of the former by methods perfected in similar enquiries in agriculture. Plans have been laid also for work during 1928 on the amount of food taken daily, the rate of digestion and allied matters: these researches will be conducted at Heligoland, both by observations at sea and experimental work in the tanks at the Station.

In England the position is somewhat similar. Collections of stomach contents were made in the "George Bligh" when opportunity permitted, and in connection with this work hauls were made with the Petersen grab, Agassiz trawl and dredge, and experiments on feeding were planned for the following year. Some work will be carried out in small tanks at the Laboratory at Lowestoft, and a partly enclosed pool is in preparation on the beach at Cawsand, near Plymouth, for use in investigations in the open.

Littoral fishing. Apart from work close to the shore which has arisen in the progress of more widely based researches, attention has been paid directly to inshore conditions and fishing on the south coast of England. Similar work has been in progress since 1924, in which year a motor boat, the "Olive", was acquired for its prosecution. The object sought is the acquisition of information adequate to form a basis for the rational regulation of the inshore fisheries, and the base chosen was Poole, which is not only the seat of one of the most important inshore fisheries of the coast, but presents a varied set of natural conditions which fit it for the establishment of methods suitable to such

research in general. From Poole the observations extended westward. In view of the practical object of the work the trawl used locally was employed, but for the study of the stock a small meshed trawl was used, and much attention devoted to the design of gear suitable for use from boats, and of recording tide-level gauges and similar apparatus.

Much of the work was directed to the local study of plaice, and will be mentioned in connection with that fish; but it may be said here that some connection was found between concentrations of plaice and of the species on which they feed. A connection was found between the disappearance of oyster culch from Poole harbour and the overlaying of food-bearing beds as sand encroached on the area. Observations were made also on the seasonal occurrence of prawns and on the growth rate of oysters; and intensive enquiries in the Harbour and its approaches were carried out with a recording current meter.

A report on the cockle and cockle industry on the English and Welsh coasts was published during 1927[1]).

In Germany also work proceeded on the oyster and oyster culture, and on the lobster: the possibility of increasing the supply by hatcheries is being explored.

Experiments with Savings Gear. The investigation of the possibility of developing a trawl which would permit effectively of the escape of fish of all species below an agreed size while retaining legitimately marketable fish, is in the stage of enquiries as to the size of the various species passing through meshes of different designs and various dimensions. During 1927 the bifid trawl known as the trouser trawl was used for this purpose: the trawl is made with two cod ends, which are braided with different meshes; the comparative action of the two meshes upon the fish entering the mouth of the trawl is thus made possible without the use of covering nets. A somewhat extensive programme was made for this work during 1928, of which the first stage is a preliminary study of the theoretical relation between the mesh and the cross section of the fish and the second the systematic examination of the action of various meshes used always in comparison with a standard mesh. The material collected in the North Sea during 1927 is insufficient for a separate report. At Poole it was found that a very slight increase of mesh in the local trawl would save large quantities of I-group plaice which, owing to the rapid growth rate prevailing in the area, in a little over a year's time would provide a useful stock of plaice of 28 to 38 cms. in length. It should perhaps be added that difficulties have been experienced in the reliable working of the trouser trawl from large vessels, and the use of covered nets has not been abandoned.

The Ridderstad trawl was tested in the North Sea from the Research Ship "George Bligh". The same net was investigated by Germany. The work was hampered by stormy weather and by the difficulty of testing the gear from the "Augusta". Owing to the courtesy of Professor Pettersson and the Swedish staff, however, German workers with the co-operation of the crew of the "Skagerak" tested their own nets from that vessel, in the waters of the Kattegat.

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[1]) Wright, F. S. A Report on the Cockle Beds and the Cockle Industry of England and Wales. Ministry of Agriculture and Fisheries. Fishery Investigation Series II. Vol. IX. No. 5. 1927.

A contribution to the theory of the selective action of the trawl appeared during 1927[1]). The selective action of the drift net also has come under observation[2]). Distinct differences in catch of nets of 35, 38 and 48 meshes to the yard were distinguished.

Cod.

In France the food of the cod has been studied, and observations have been made on the size and maturity of this fish, both along the coast and on the North Sea Banks. The English researches on cod have been continued, and the records of recapture of marked cod have been received at the Laboratory. The reports upon the material, and studies of age determination methods, however, were delayed by the absence of the naturalist in charge of the work through the greater part of the year, owing to his employment in conducting a preliminary fishery survey of inland waters in Kenya Colony.

The Scottish investigators have marked cod, so that the English marking experiments may in this way be extended northward. Records were made also of size, sex, and maturity of all cod taken in the trawlings of the "Explorer".

Haddock.

Reference has already been made of the contribution of the Sub-Committee (English ichthyometric data) to the Northern Sub-Committee. In November the Scottish "Explorer" made an investigation of the distribution and abundance of 0-group haddock in the Southern North Sea.

Herring.

It will be convenient to group the work on this fish under the same heads as those adopted in the last report.

1) Statistics. In England and other countries the collection of these data has proceeded as before. The statistics of the German herring trawling industry, including records of quantity and locality of catch, with port of landing, have been published in a provisional form[3]). The same periodical had given similar detailed statistics for the North Sea drift net herring fishery. With this material it was possible for the German investigators to draw up a chart of the grounds frequented by the vessels of their country indicating the distribution of the fishing, its intensity, and the productivity of the various grounds. This chart, which has already appeared[4]), will be repeated for the fishing of a later date.

2) Investigations of unselected samples of known place and time of capture. Samples from practically the whole of the herring grounds within the area dealt with

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[1]) Wollaston, H. J. B. On the selective Action of a Trawl Net, with some Remarks on the Selective Action of Drifts Nets. Journ. du Conseil, Vol. II. No. 3. 1927.

[2]) Hodgson, W. C. Preliminary Note on Experiments concerning the Selective Action of Drift Nets. (The same.)

[3]) Lissner, H. Der Deutsche Trawlheringsfang 1927. Der Fischerbote pp. 3—10, 1928.

[4]) Lissner, H. Die grosse Heringsfischerei in Deutschland. Ber. der Deutsch. Wiss. Komm. III. pp. 285—338. 1927.

by the Southern North Sea Committee were examined, very general attention to the investigations of the herring stock being a marked feature of 1927.

The English samples were obtained from North Shields and Lowestoft thus covering the greater part of the herring grounds along the English North Sea coast, and from Boulogne. The French samples came from all the chief grounds from the Dogger Bank to Cape Antifer, the German procured partly from the markets at Altona and Hamburg and partly through the British fishery laboratories, were taken on the Fladen ground, Dogger Bank and elsewhere. Those examined in Holland were from the inshore fisheries chiefly, particularly from the southern parts of the coast and estuarine waters; but samples were obtained also from Sandettie, Leman Ground and Dieppe. Particular attention was directed to very small herring in Holland owing to the utilisation of the scales of this fish in the manufacture of artificial pearls.

Practically in each of the samples, the length, maturity and age were examined, the age analysis being of great importance in the study of the fluctuation of supply. Generally the scale method was employed, but in Germany the otoliths were examined for this purpose. The results obtained have been published in part[1]). A report[2]) on the French observations will appear shortly. The French observers found both in the North Sea and the Eastern end of the Channel a relatively high proportion of herrings with two winter rings compared with those with three, and a diminution of the mean size of the herrings taken. The English researches showed[3]) that on the Autumn fishing grounds the 1921 year class still continues to play an important part in the stock, and a new group (that of 1924) has made its appearance in comparatively large numbers.

3) Distribution of young herring. Reference has been made to the study of very young herring in Holland. Investigations as to distribution and abundance were made also in France, where whitebait was again examined. The proportion of herring present was found to increase as the season progressed; in one sample, from Honfleur, it was found to be as high as 92 per cent.

The Scottish Research Ship "Explorer" made a cruise in November from Aberdeen southward to the Dogger Bank to determine the distribution of the autumn brood of larval herring and to investigate the distribution of the larvae hatched off the Scottish East Coast. On this cruise drift bottles were put out from the Firth of Forth southward.

4) Study of herring races. In England a research into herring races based mainly on the constitution of the vertebral column, has been commenced, the material consisting of samples from the grounds off the eastern coast of England and in the eastern end of the Channel. Race research in Germany, the results of which have appeared from time to time, is still in progress; these investigations deal not merely with North Sea herring, though practically all North Sea herring grounds are represented in the material,

[1]) Vide supra also H. Lissner. Untersuchungen an Heringen der westlichen Nordsee. Ber. der Deutsch. Wiss. Komm. III. S. 47—90. 1927, and der Fischerbote p. 495. 1926.

[2]) Le Gall, J. Remarques et Statistiques biologiques sur les harengs de la Mer du Nord, de la Manche et de l'Atlantique.

[3]) Hodgson, W. C. Size and Age Composition of the East Anglian Autumn Herring. Journ. du Conseil. Vol. II. No. 1. 1927.

but with many other regions, including the Skagerak, the Shetlands, Fair Island, North of Ireland, and grounds fished from Fleetwood, Plymouth and Aalesund. The curious observation has been made concerning the coastal and estuarine herring of Holland and some examined in Holland from grounds off the coast, that in race these fish differ from those of Lowestoft and the Channel, the keeled scales between ventrals and anus being definitely fewer in number than in the Lowestoft race as described by JOHANSEN and SCHNACKENBECK. The Dutch herrings approximated far more closely to the Plymouth stock than to those of nearer grounds.

5) Location of spawning places. Danish investigators made observations on Commercial Fishing Vessels regarding the occurrence of herring eggs in the stomachs of haddock over the area from the Dogger Bank and Jutland Bank to the west coast of Jutland between 55° and 57°. The work was carried out both at sea and in more detail upon samples brought to port. The period covered was September to December. No herring spawn was found.

The spawning grounds along the English North Sea coast have been dealt with in some detail by observations upon haddock which had been feeding on herring spawn. In Germany the material collected in previous years has been supplemented by samples taken near Heligoland and along the German coast. This material was examined in order to ascertain the chief spawning places and also the distribution of the larvae. The greatest abundance of young larvae was found over the spawning ground which lies east of the Deep Water near the entrance to the Channel. In the winter catches this area was by far the most important. Very young larvae were found in the material from the Oyster ground, Kattegat, edge of the Norwegian Deep about Stavanger and further northward. From January to April herring larvae were found abundantly throughout the south and east part of the North Sea, as far as this is under the influence of the Channel influx and the coastal water; while in the northern and western part of the Region, including the Dogger Bank and the greater part of the Great Fisher Bank few or none were taken except at certain stations quite near the coast of Great Britain. The larvae are found most abundantly in water bearing neritic plankton, and with growth move towards the coast. The distribution of the herring larvae thus closely resembles that of the ova and larvae of the plaice.

In the south-east North Sea the catch was found to consist essentially of two size groups, which had already been distinguished by the Dutch in the waters near the Channel entrance. This obviously valuable contribution to the subject of Professor MIELCK closes with the remark that many questions remain for solution, and that the results of the cruises made so far give indications as to positions and seasons at which further work will need to be carried out in order to solve them.

6) Food investigations. The investigation of herring food can be considered most conveniently under Plankton.

Plaice.

Contributions have been made to all branches of work on the plaice, and in particular great attention has been paid to keeping as full a record as possible of the

character of the stock, so that changes occurring in it may be both traced and assigned in accurate degree to their proper causes. Particular care has been taken therefore to secure measurements and age determinations on an adequate scale. The work done may be mentioned under the following heads.

1) Statistics and Ichthyometrics. No change was made in the general methods of collecting these data: as has been said, a very large number were measured in England and a large number in Germany. In addition, in both countries plaice were measured on the research vessels.

Additional information was contributed from Denmark by experimental fishing, carried out in March 1927 with a 50 feet otter trawl between 10 and 24 metres in depth from the latitude of Horns Reef to 55° N. Lat. These indicated that the bulk of the stock in this area were to be found in 13 m. or less, the greatest catch, 3,364 per hour, being taken at that depth. The numbers of plaice outside 10 m. were much as in 1925, but as compared with that year a greater proportion were older. A report[1]) on the whole of the Danish work will appear shortly.

2) Age Determination. In the Danish catches referred to the most numerous year group was that of 1922; the next in order of importance were those of 1925 and 1923, while those of 1924 (the II-group) were less common. As has been said, the catch of 1927 was older in character than that of 1925, the number of IV- and VII-groups (reckoned after April 1st) being double that of the earlier year.

In England an extensive programme had been arranged for this purpose. It was hoped that adequate samples would be obtained in April and November off the Danish, German and Dutch coasts, comparable to those collected in November of 1926. Owing to bad weather certain stations were necessarily omitted in April, and when trawling was possible the catch was very small. Weather conditions were more favourable in November, but in spite of repeated hauls the catch off the Danish and German coasts was inadequate for comparison with the previous year. The numbers of plaice otoliths taken were as follows:—

	April		November	
Horn Reef	20	1 haul	73	3 hauls
Graa Dyb	171	2 hauls	29	2 hauls
Near Helgoland		—	100	3 hauls
Skiermonikoog		—	572	1 haul
Off Ymuiden	608	1 haul		—
Haaks Light Vessel		—	410	1 haul

A cruise was carried out in June to the Clay Deep and the Lower Scruff for the purpose of obtaining otoliths of plaice in the more central grounds of the North Sea; and a further cruise to the same grounds in November was planned in order that a comparison of the growth rates might be made. Since, however, only 151 plaice were caught in Clay Deep in the course of 7 hauls and 216 in 5 hauls in the Lower Scruff in June, the

[1]) Jensen, A. I. C. An investigation of the Stock of Plaice in the Southern Horns Reef Area in the Spring and Autumn of 1925 and Spring of 1927. Meddelelser fra Kommissionen for Havundersøgelser, Serie Fiskeri. Bd. VIII. No. 6. 1928.

material was deemed inadequate for purposes of comparison and the Autumn cruise was abandoned. A collection of 579 otoliths was made near the Haaks Light Vessel in August, in the course of mesh experiments. The annual line of Stations from the Leman "Ground" to the Haaks Light Vessel was trawled in May, when 3,069 plaice were otolithed; an attempt was made to repeat the line in September but owing to very rough weather trawling was discontinued before the two most easterly stations were reached; 1,685 plaice were taken and otolithed in the five stations trawled. The total number of Plaice otolithed in 1927 in the course of the research cruises were 7,793.

The investigations of the age composition of the various Trade Categories of plaice for the purpose of relating the degree of abundance prevailing with the year groups represented commenced in 1926 was continued, and collections were made from April to July and in December. The numbers dealt with were as follows:—

	Dead Small	Best Small	Small & Medium	Best Medium	Large
April—July	671	266	319	163	—
December	592	297	246	347	233

The material has not as yet been fully worked up, but it is evident from a preliminary examination[1]) that the 1922 year class which was so markedly predominant in the landings as the IV-group is still accountable for a large proportion of the catch; also the 1923 year class which had been shown to be sparse as the III-group in 1926 is still more poorly represented as the IV-group in 1927.

A report on the English plaice investigations in the years 1924 and 1925 has been published[2]). In this report are included the results of the Age determination investigations carried out in 1926.

The German researches were based on the plaice about Heligoland in July and September and between that island and the coast in February and May. The first of these collections of otoliths numbered 2,786, the second 1,504. As in the previous year, the 1922 year class (as Group V) was the most numerous class represented.

It will be remarked that observers of all three countries record the predominance of the V-group or 1922 plaice. This predominance of one class in the catch in successive years is in itself remarkable, and is rendered the more so by the marked sparsity of the additions to the stock yielded by some of the following years. It was confidently thought that the degree of success or non success of the survival to the end of the first year of a given brood would exercise an important influence on the abundance of the marketable stock in subsequent years; and this may now be said to have been demonstrated. This, it must be recognised, however, is but one of the factors determining abundance of stock, which will always be affected by the intensity of fishing.

3) Investigation of the younger stages. Researches on the 0- and I-group

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[1]) Thursby-Pelham, D. E. Report on English Plaice Investigations 1924 and 1925. Ministry of Agriculture and Fisheries. Fishery Invest. Series II. Vol. X. No. 3. 1927.

[2]) Thursby-Pelham, D. E. Fluctuations in the Age Composition of the Plaice Stock in the Southern North Sea during the Period 1923 to 1926. Journ. du Conseil. Vol. II. No. 2. 1927.

plaice were made by Germany off Heligoland and Büsum, in the Elbe estuary and in Amerikahafen, Cuxhaven. Over 10,000 small plaice were measured and over 5,000 otolithed. It was found that in the Elbe area 0-group plaice were present in remarkably larger numbers in 1926 than in 1927. It will be instructive to trace this 1926 group in the trawl catches of future years.

4) Food of plaice and 5) Savings gear are sufficiently mentioned above.

6) Growth rate. In Heligoland it has been found that since 1925 the growth rate has very slightly increased, especially in the younger year groups. It has fluctuated, however, the growth rate of 1924 exceeding that of 1925. It was noted also that the mean length of the 0-group in 1926 was as good or better than 1927 notwithstanding the fact that the density on the ground was greater in the earlier year. This is in accordance with difference of growth rates found by the English workers on the Danish and Dutch grounds in 1926, when the higher growth rate was found on the more populated ground.

An attempt was made to correlate the width of the rings found on the otolith with the growth of the fish: no details of the enquiry are available as yet.

Investigations on the growth rate of plaice were made by marking experiments at Poole Harbour. Plaice transplanted from the Dutch grounds were released in the Harbour. All the recaptures but one were made in the waters outside. The growth rate of the transplanted fish was only about half that of the indigenous stock.

7) Races of plaice. This research has been begun in Germany upon material from the North Sea, Iceland, and the Norwegian coast, in order to determine whether these and the Baltic plaice are racially distinct. In the event of a positive result the research will be continued intensively for the Baltic and Barents Sea

Other Fish.

Sardines. The sardines of the Channel have been studied by M. Le Gall, who shortly will contribute a report of his work to the Journal du Conseil. He considers that the Sardines of the eastern end of the Channel and those of the Plymouth area are of the same race and that the shoals are composed of mature fish of large size and mostly from 5 to 7 years of age. He finds but one spawning ground in the region, extending from the western end of the Channel to the sea off Plymouth.

Sole. Both measurements and age determinations of soles have been carried out in Germany. The latter, based mainly on scale readings, exhibit, like several other species the predominance of certain year groups in the catch, the 1921 and 1917 also being important. (See also Ichthyometrics.)

Sprat. Mr. Bjerkan carried on the examination of samples of sprats from the Southern North Sea, in continuation of the work on which he reported at the last meeting of the International Council. Unfortunately many of the fish were damaged in transport to Bergen, and age determination was rendered difficult in consequence. This damage appeared to be due to the use of formalin as a preservative: and it would seem necessary for really satisfactory working to use fresh material. The samples (ten from the North

Sea as well as one from the Irish) however, were large, and by combining such age determinations as were possible with observations on length and maturity, certain conclusions were reached.

The Lowestoft samples which had an extreme range in length of 9.5 to 15.0 cms. consisted of the year classes 1922 to 1925, the oldest two groups only in small numbers. The predominant year class was that of 1925, about a year and a half old at the time of capture: this made up from 60 to 90 per cent. of the samples. Sizes within one year class were very varied. The 1925 group also made up some 65 per cent. of the Brightlingsea sprats, 30 per cent. being 1926 group fish, older fish making up the remaining 5 per cent. The mean size of the dominant 1925 class was about 11 cms. in the Lowestoft samples and 10.5 cms. in the Brightlingsea. It may be added for purposes of comparison that in a Scottish sample from St. Andrews the mean size of the 1925 class was 11 cms., and that the same year class was predominant in the Irish Sea sample.

Dr. Bjerkan also commenced the racial study of the sprats by comparisons of the number of vertebrae. The mean numbers were as follows:—

Ostend sprats, November 1926	47.714 ± 0.055	(number 77)
Lowestoft sprats (Brightlingsea), February 1927	47.625 ± 0.066	(— 80)
St. Andrew Bay sprats, January 1927	47.934 ± 0.082	(— 76)

The average number for the Norwegian sprat is about 48.

French observations on the sprats of their waters confirm previous results. The second winter ring was visible on sprats of a mean length of 12 cms.

Tunny (*Thunnus thynnus*). The occurrence of tunny in the North Sea continues to be studied by French observers. It was less common during the summer of 1927, especially in the Southern and central parts of the area[1]).

Whiting and Pout Whiting. The size and maturity of the stock of these fish in the eastern end of the Channel has been studied in France. The first maturity in this stock is reported to occur at a length of 24 to 26 cms., when the fish is in its third year.

Pollack. Occurred in whitebait taken at Boulogne.

Plankton.

The French collections, made from the Fishery Cruisers "Sentinelle" and "Estafette" are not yet completely worked up. A first examination, however, showed as three salient features the abundance of *Ceratium tripos* on the North edge, and to the Northwest of the Dogger Bank in September and October, the frequency of *Limacina helicina* from that region to the Long Forties and the extreme though sporadic abundance of *Aglantha digitalis*.

The English work was directed towards the relation of the plankton to herring. Plankton cruises were made in April, June, August and October along the east coast of England. Stations were made at 25 mile intervals along three lines, 25 miles apart,

[1]) Le Gall, J. Contribution à l'étude de la Biologie du Thon Rouge (*Thunnus thynnus* L.). Journ. du Conseil. Vol. II, No. 3, 1927.

and running roughly parallel to the coasts from the Southern Bight to the Northumberland Coast. The object of the work was to study the movements of the plankton throughout the herring fishing season in this important area, and it is intended to carry out the work over a number of years. Three of the cruises were completed, but the June cruise owing to adverse weather conditions could not be finished.

An extra plankton cruise was made early in November to ascertain, if possible, whether the unusual eastward movement of the herring shoals was due to an aggregation of diatoms or *Phaeocystis* in their usual haunts or to an abundance of food in the area where they were then shoaling. The result was inconclusive. No diatom masses were located, but *Phaeocystis* was found in abundance to the north of the shoals in a narrow band, some 50 miles in length, extending in an E.—W. direction. It would appear probable that this band hindered the recruiting of the herring shoals off Norfolk from the north and east. There was also a band of *Noctiluca* about 40 miles long, stretching across the herring ground in a S.W.—N.E. direction. There was no appreciable difference in the quantity of copepod plankton on the old and new shoaling grounds.

Progress has been made in working up the extensive material collected during 1926 in connection with the relation between plankton and herring food (see Proc.-Verb. XLI. p. 184, 1927. XLV. p. 134, 1927).

Some estimations of fat in plankton were made during 1927 at Lowestoft, but this work is in abeyance.

At Heligoland regular plankton collections, and the experimental investigation of the catching powers of various plankton nets (undertaken at the request of the Plankton Committee) are in progress. A German report[1]) was published also dealing with pure culture of phytoplankton, and, by biological methods, with the total food content of the sea water off Heligoland.

The collection of plankton samples from German vessels was arranged as far as possible to afford information as to the vertical distribution and diurnal movements of plankton under the influence of light. It was intended to correlate the movements of herring with that of the plankton on which they were feeding.

The surface catches of the North Sea (to depths of 32 m.) have been studied and enumerated. Meanwhile it has been shown that catches out of medium depths (to 100 m.) and greater depths (more than 100 m.) are composed differently in their very essence, and a study of these latter is indispensable for the understanding of the hitherto hidden associations; it is therefore no less important than the knowledge of the surface water relationships.

Hydrography.

England. Hydrographic observations were made on 8 cruises of the Research Ship "George Bligh" in April (2), May, July, August, September, October, and Decem-

[1]) Schreiber, E. Die Reinkultur von marinem Phytoplankton und deren Bedeutung für die Erforschung der Produktionsfähigkeit des Meerwassers. Wiss. Meeresuntersuchungen. Abt. Helgoland. XVI. No. 10. 1927.

ber 1927. On three of these cruises observations were directly connected with plankton investigations; on one cruise where trawling was the main object, a line of surface samples was run. The four remaining cruises were devoted solely to hydrographic work, the observations being designed mainly to provide data for the investigation of water movements and salinity distribution and their mutual relation. In July H.M.S. "Godetia" and "Garry" co-operated with the "George Bligh" in this work.

In addition, experiments with new types of drift bottles were made; further tests of the densimeter designed at the National Physical Laboratory were made (Rapp. et Proc.-Verb. XLI, 1927, p. 60). It is hoped that a description of these experiments will be published shortly in the Journal du Conseil. Further tests of a surface sampler were carried out; the instrument has been described[1]).

Surface observations have been maintained from commercial vessels on the same routes and the same Light Vessels and with the same frequency as in 1926. A full list is published in Rapp. et Proc.-Verb. XLV. 1927, p. 136.

Direct current observations. The observations on the flow of water through the Straits of Dover (which are carried out by means of a Current-Indicator installed on the Varne Light Vessel) have been maintained throughout the year, and a report upon them has been prepared for publication. The Current Indicator on the Inner Dowsing Light Vessel also has been working continuously through the year. Experiments with short period floating drift bottles have been made on several occasions and a paper on the subject is in preparation. These bottles are designed to sink after a predetermined time, and then anchor until trawled up. It is hoped by their aid to trace the path of a current more completely and surely than has hitherto been possible. It may be added that other bottles have been fitted with drags or vanes at some distance below the bottle, so that they respond less to the direct effects of wind at the surface and of the thin superficial layer driven by the wind (see also under Littoral fishing above).

The German work on salinity and temperature (see Rapp. et Proc.-Verb. Vol. XLV, 1927, p. 64a-d) was continued. (See also under Plankton.)

In June hydrographic observations were made by the Scottish Research ship "Explorer" across the North Sea along four parallel sections running eastwards from the Scottish Coast to extend northwards the comprehensive hydrographic survey carried out by the English vessel and H.M. "Patrol" ships at this period. The two most northerly sections examined during the first fortnight in June extended from Fair Isle to Marstens Light and from the Norwegian Deep to Rattray Head, while the two sections further south, completed during the last fortnight in June, ran in an approximately North Easterly direction from the vicinity of Aberdeen and Sunderland. The distances between the observation points were approximately 30 miles.

Temperature observations at 4 hourly intervals were continued from the Terschellinger Bank, Haaks, Noord Hinder, Maas and Schouwen Bank Light Vessels, and daily

[1]) Lumby, J. R. The Surface Sampler, an Apparatus for the Collection of Samples from the Sea Surface from Ships in Motion. Journ. du Conseil. Vol. II. No. 3. 1927.

salinity samples collected at the four ships first named. Salinity and temperature observations obtained from the routes Flushing to Harwich and Rotterdam to London, the weekly number of samples taken being 42 and 36 respectively from these two lines.

Computations were made from these observations for the purpose of determining normal yearly isohalines for the Southern North Sea. Salinity anomalies in the various years and mean annual range of surface salinity have also been determined from the Light Vessel observations.

TRANSITION AREA
1927.

By

A. C. Johansen.

Besides the meeting in May 1927 in Stockholm there was held a combined meeting of the Transition Area and Baltic Area Committees in Copenhagen in November in order to discuss the scientific basis for practical measures to be taken regarding the plaice, the flounder and the salmon in the Transition and Baltic Areas. At the meeting in Copenhagen the members of the two Committees agreed to recommend to the Council that certain practical measures for the protection of the Plaice, Salmon and Sea Trout in the Belt Sea and the Baltic should be taken, and that a scientific report containing the reasons for the proposals should be worked out for the consideration of the Council.

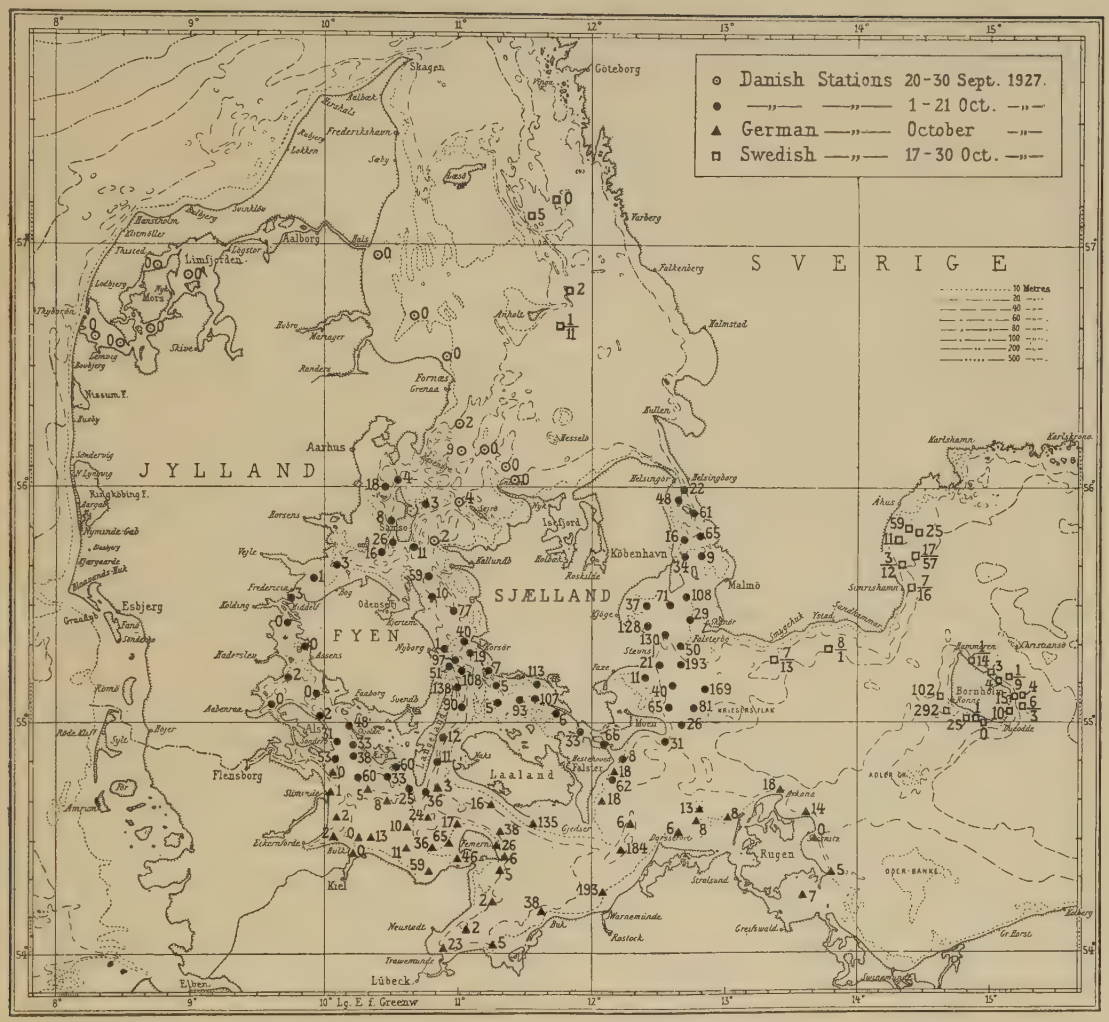
The main investigations carried out during the year 1927 in the Transition Area have concerned the Plaice and the Herring, but also several other species of fish have been the object of investigations, such as Haddock, Flounder, Dab, Witch, Turbot, Sprat, Salmon, Sea Trout etc. The work carried out is mentioned here under the headings of the different countries except that regarding the location of spawning places for the autumn spawning herrings. A very close co-operation took place in this respect between Sweden, Germany and Denmark, and I have been asked by the Swedish and German representatives to give in this report a short description of the results obtained.

The object of the investigations was by means of fishing experiments with a 2 meter stramin ring trawl to catch the newly hatched herring larvae and thereby to locate the more important spawning places. The area covered is part of the Kattegat, the Sound, the Belt Sea, the Arcona Basin and part of the Bornholm Deep.

The main results of the experiments are given on the Chart Fig. 1, where the figures denote number of herring larvae of 5—9 mm. length caught by the stramin ring trawl per 30 minutes' haul. It should be noted that the main spawning time for the autumn herring in these waters is September and beginning of October.

It appears from the Chart that there have been several important centres for the spawning in the autumn of 1927, viz.:—

1) The southern part of the Great Belt with the Smaaland Bay.
2) The waters between Fehmarn, Langeland, Ærø and Als.
3) The waters between Laaland-Falster-Møen and the German Coast from Warnemünde to Darsserort.


Danish Stations 20-30 Sept. 1927.
„ „ „ 1-21 Oct. „
German „ October „
Swedish „ 17-30 Oct. „
SVERIGE
JYLLAND
FYEN
SJÆLLAND
Laaland
Rugen
Aarhus
Esbjerg
Flensborg
Kiel
Lübeck
Rostock
Warnemünde
Malmö
København
Helsingborg
Helsingør
Göteborg
Skagen
Frederikshavn
Aalborg
Limfjorden
Nissum F.
Ringkøbing F.
Horsens
Fredericia
Odense
Nyborg
Korsör
Kallundb
Roskilde
Faxe
Stevns
Gedser
Darsser
Falsterbo
Ystad
Simrishamn
Karlshamn
Karlskrona
Varberg
Falkenberg
Kullen
Hesselø
Anholt
Læsø
Skive
Thisted
Lemvig
Hvide Sande
Esbjerg
Grindsø
Ribe
Aabenraa
Sønderborg
Als
Fænø
Sejrø
Kalundborg
Nakskov
Lolland
Falster
Møn
Bornholm
Rønne
Hammerhavn
Svaneke
Nexø
Christiansø
Ertholm
Ertholmene
Ahus
Sandhammaren
Langeluft
Ystad
Trelleborg
Smygehamn
Skanör
Falsterbo
Stevns
Møen
Gjedser
Darsser
Rønne
Bornholm

The numbers obtained in the waters between Falster and Darss were about twice as high in 1926 as in 1927. On the other hand, the numbers found in the waters between Sealand, Møen and Scania were somewhat higher in 1927 than in 1926.

Denmark.

The research vessels at disposal for the investigations in 1927 were as follows:—
s.s. "Dana" some days in the beginning of April.
s.s. "Japetus Steenstrup" from the 1st of March to the 21st of October.
A motor boat from the 15th of July to the 28th of August.

Plaice Investigations.

Fishing experiments with a fine meshed otter seine ("Eel-tog") were carried out in the Limfjord, the Kattegat, the Belt Sea and the western Baltic in the period from April to September. It was found that the year class of 1925 was dominant in the Limfjord, the Kattegat and the Belt Sea, but that the numbers caught per hour were not very great except in the western parts of the Limfjord, the north western Kattegat and in some small areas of the northern and middle Belt Sea. The year classes 1926 and 1924 were but sparsely represented in the Kattegat, Belt Sea and Baltic. The year class 1923 was proportionately well represented in the Baltic.

Fishing experiments from motor boat with a small fine meshed plaice trawl close to the shores of the Kattegat, Belt Sea and the western Baltic in July and August 1927 proved that the year class of 1927 was very well represented in the southern Kattegat, Belt Sea and western Baltic, whereas the year class of 1926 was very poor.

Marking experiments with plaice transplanted from the Nissum Broad to the Livø Broad and Risgaarde Broad of the Limfjord in April of 1927, showed that the plaice in the course of one to two months left the Livø and Risgaarde Broad and migrated in a westerly direction to waters of greater salinity. Marking experiments with plaice transplanted from Nissum to Visby Broad and Thisted Broad in April 1927, showed that the plaice remained in the Visby and Thisted Broad during the whole summer and autumn of 1927.

Herring Investigations.

By fishing experiments with a 2 meter stramin ring trawl in the first part of March it was found that a spawning place for a winter-spawning herring occurred in the northern part of the Belt Sea. (A. C. Johansen: On a Spawning-Place for a winter spawning herring in the northern part of the Belt Sea. Report XXXIII of the Danish Biological Station. 1927.) Fishing experiments with the same fishing apparatus were carried out in September and October in order to locate the main spawning places for autumn spawning herrings. The main results of these experiments are presented in Fig. 1.

Herring from the Belt Sea and the western part of the Baltic proper were examined with a view to investigating the racial characteristics and to determining the age and growth.

The investigations on the food of the herring have been continued, and Dr. P. Jes-

PERSEN has completed his great work: "Investigations on the Food of the Herring in Danish Waters" (Medd. Komm. f. Havundersøg. Ser. Plankton Vol. II. No. 2. 1928). Dr. JESPERSEN has here shown that the youngest stages of post larval herring (5—9 mm.) live mainly on phytoplankton, gradually changing over to animal food. Their animal food consists first of nauplii, copepod eggs and young copepods, later of adult copepods, cladocerans etc. Copepods are by far the most important item of food among the adolescent stages of post larval herring and the metamorphosis stages. Copepods are also numerically predominant in the food of young herring 16—17 cm. in length, but in summer and autumn cladocerans are also found in considerable quantities.

A comparison between the occurrence of the different organisms in the food of the herring and in the plankton samples taken, shows that the herring do not feed indiscriminately on the plankton as a whole, but select certain organisms in preference to others.

Haddock Investigations.

As mentioned in previous reports haddock occurred in unusually large quantities in the Belt Sea in the years 1924—26, the great majority being in all these years the 1923 brood. In the winter 1927—28 a number of large haddock of the 1923 brood were still found in the Belt Sea, and in addition a not inconsiderable number of the 1927 brood occurred there.

Valuation of the Sea Bottom.

In the Great Belt, the Smaaland Bay, the Sound and the Baltic E. of Sealand and Falster a number of bottom samples were taken with Petersen's Small Grab in the period April—June. In certain places with sandy bottom comparative experiments with Petersen's Grab and Knudsen's Bottom Sampler were carried out, and the results confirmed that obtained in 1926, i. e. that the Knudsen Sampler penetrates far deeper into the sea bottom and takes also a greater quantity of bottom organisms per unit of surface than the Petersen Grab. In the Limfiord valuation of the sea bottom was carried out in September with Petersen's Small Grab.

Plankton Investigations.

Quantitative Plankton investigations have been undertaken in the Kattegat and Belt Sea, partly in connection with investigations on the food of the herring (see under Herring Investigations).

Hydrographical Investigations.

Hydrographical investigations are carried out in connection with the biological researches from s. s. "Dana" and s.s. "Japetus Steenstrup". The titration is made from the Danish Hydrographical Laboratory (Director: Professor MARTIN KNUDSEN), and the investigations concerning the amount of CaO in water of different salinity have been continued.

Germany.

Investigations on flatfish, especially plaice and flounders, again in 1927 occupied the foremost place in the programme of work. The extension of the investigations was,

however, restricted owing to a change of assistants, and the chief task thus came to be the working up of the material collected in the preceding years. New investigations were carried out dealing with the Pomeranian Bay, which, owing to the special features presented by the Oder Bank with regard to the flatfish stock, occupies an exceptional position which renders difficult a uniform legislative regulation of the trawl fishery to the east of the Darss Ridge. An introductory publication by Dr. Heidrich: "Die Pommersche Bucht, eine Brutstätte für die Plattfische der mittleren Ostsee" appeared in the Mitteilungen des Deutschen Seefischereivereins, Heft 9, 1927. In the second half of the year statistical researches were carried out from several stations on the importance of the various flatfish, in particular the plaice, in the Pomeranian Bay. The large number of young plaice in the Swinemünde Bay was especially noteworthy in these series of observations. The projected autumn cruise of the "Poseidon" which was to continue and supplement previous investigations, had to be postponed to 1928.

The introduction of a close season during the first months of the year must be regarded as the most important measure for maintaining and augmenting the catches of flatfish, also in the regions to the east of Rügen. By this means a material improvement in the summer catches may be expected and at the same time a stop would be put to the waste of the flatfish catches in winter. These aspects of the case must be the guiding principles when continuing the work dealing with flatfish, as regards both the plaice and the flounder. There still remains the question which as yet awaits a satisfactory solution, namely, the recruiting of the progeny of the plaice stock in the eastern regions.

Dr. Henking carried out in April 1927 at Stakendorfer Strand a fresh investigation on the composition of the plaice catches, and a detailed report comparing the results from previous years will be issued on the material collected. He observed a greater decrease in the number of females than in the number of males. Further researches in the course of the summer showed a great decline in the plaice fishery also off Dahme, Kellenhusen, Wismar, and Warnemünde.

In the western Baltic other new investigations on the plaice were not undertaken, since the examination of the statistics of landings in Lübeck Bay, where in recent years an active plaice fishery with gill nets has been carried on, revealed so great a decline in this fishery that investigations would necessarily have failed for lack of material.

The question as to whether the plaice trawl fishery might have a better basis if it were devoted to the capture of other species of fish led incidentally to a study of the herring trawl fishery in Kiel Bay, regarding which detailed information is contained in Dr. Heidrich's publication "Trawlheringsfang in der Ostsee", Heft 11, Fischerbote 1927.

Further observations have been made regarding the occurrence of the haddock, which has appeared mainly in the western region although some few specimens have been found in Pomeranian waters and as far distant as in the Bornholm Basin. These observations have been collected and published by Dr. Heidrich in the Fischerbote 1927, Heft 7, under the title of "Die Schellfische in der Ostsee". The projected extension of the investigations so as to include the cod stock had to be abandoned temporarily on account of the changes in the staff.

In the Transition Area, Dr. Altnöder (Travemünde) continued in 1927, on behalf of Professor Henking, his investigations on herring. A publication dealing with this work is approaching completion. The racial question is the main subject discussed in it. He has also ascertained all particulars relating to the spawning of the spring herring in the Dassower See, in the Potenitzer Wiek, in the Schley and in the North Sea—Baltic Canal.

Dr. Altnöder moreover undertook a special expedition with a motor cutter from Kolberg and studied the spawning of the autumn herring on a fourteen day's cruise extending from Travemünde northwards to Flensburg and further round Fehmarn between Gjedser and the German coast eastwards to Darss, Stralsund, and round Rügen, thus supplementing admirably the simultaneous investigations of Dr. A. C. Johansen (Denmark) and Dr. K. A. Andersson (Sweden). On the results of the experiments see Fig. 1.

Norway.

The main investigations have concerned the Cod and the Sprat (*Clupea sprattus*) in the Skagerak.

The investigations of the cod are carried out by Director Alf Dannevig in connection with the hatching of cod-larvae at Flödevigen. In the summer and autumn of 1927 a series of fishing experiments for young cod have been undertaken in several fjords of southern Norway in connection with hydrographical investigations. Investigations concerning the influence of the temperature in winter upon the spawning of the cod have been undertaken in different years, and a paper on this question by Alf Dannevig is ready for printing.

The investigations of the sprat have been carried out by Mr. Bjerkan, who published a paper on the results of his investigations in 1926: "Brislingundersøkelserne 1926" (Aarsberetning vedr. Norges Fiskerier 1927. Nr. 1). Mr. Bjerkan has arrived at the result that young sprats of the same year class can have a rather different average size at the same time and even at the same locality, and he ascribes this primarily to the fact that the spawning time has a very long duration, namely, from February to September. Mr. Bjerkan has on the Norwegian coast found young ones of the 0-group of 15 mm. length taken in the middle of April and others of 20—30 mm. taken as late as in September. The maximum spawning in the Skagerak and adjacent part of the North Sea occurs in the last half of May and the first half of June. The investigations in 1927 have confirmed the results obtained in earlier years concerning the varying size of specimens of the same year class.

The stock of sprat consisted of proportionately large specimens in 1927. In the early summer, sprat of 1—$1^1/_2$ years age were predominant, but later in summer there was an intermixture of older specimens.

Sweden.

The research steamer "Skagerak" was used for investigations in the Transition Area.

In the period from 2nd January to 1st February and in December the vessel was used for studying the distribution of herring in the Kattegat and Skagerak.

In the first week of March and in July cruises were made in order to study the Witch (*Pleuronectes cynoglossus*).

In the later part of May and in October two cruises were made to the southern part of the Baltic for plaice and herring investigations.

In September the ship made short cruises in the fjords of the west coast of Sweden.

Herring.

In the Bornholm region rather extended investigations were made in October in order to ascertain the distribution and stock of young herring larvae. At 21 stations the big 2 m. ring trawl was used at different depths to catch the larvae (see Fig. 1). By comparing the stock of larvae from year to year it should be possible to form some idea as to the effect of the herring spawning in different years.

In the Kattegat herring larvae were also collected in October.

During the winter fishing several samples were collected in Skagerak for age determination.

The studies of the occurrence of Schizopods in the Skagerak and their importance as food for herring have been continued.

Plaice.

A great deal of time was devoted to the researches on the plaice in the southern Baltic and the influence of the fisheries upon the stock of plaice in that region. During the cruises in May and October many hauls were made in order to ascertain the density of the stock. All the individuals of the unsorted catches were measured and numerous otoliths were collected and examined in order to find out the rate of growth and the composition of year classes. Through these studies it was clearly shown, that the catch per fishing unit had greatly decreased during the last years and the rate of growth had increased in a high degree. The stock was obviously in a state of being thinned out.

The material collected in the Baltic in 1926 and 1927 has been worked up in the following papers:—

Arvid R. Molander: Recent Swedish Researches into the fish population of the southern Baltic. Svenska Hydrografisk-Biologiska Kommissionens Skrifter, New Ser. Biology I:2, and

K. A. Andersson and Arvid R. Molander: The Plaice Fishery and the Plaice in the Arcona Basin and the Bornholm Area (southern Baltic) in the period 1921—1927, not yet published.

Witch.

The investigations on the witch (*Pleuronectes cynoglossus*) were continued and in order to study the migrations some hundred specimens were marked in March and July in the Skagerak. By using very short hauls (20—30 minutes) it was not difficult in general to keep the fish alive when fixing the mark on them in the same way as when marking the plaice.

As a lot of undersized witch were landed in Sweden an investigation was made

as to the possibility of protecting the witch in the Skagerak. After a careful examination it was suggested, that when fishing for witch seines should be used with meshes of at least 9 cm. (half circumference) or equipped with a saving portion with 2.5 × 8 cm. meshes and that a size limit of 30 cm. should be imposed for witches landed in Sweden. The Swedish Government issued a law to this effect on the 1st of April 1927.

Haddock.

Complete statistics of the landings of haddock of various size categories have been procured in Göteborg. It may be noted, that the main part of the haddock landed in Göteborg belongs to the market category "small".

On the cruises in the Kattegat and Skagerak the haddock catches from numerous hauls have been measured and investigated and otoliths collected. The haddock in these catches belongs in general also to the category "small". In order to protect the small haddock the fishermen on the west coast of Sweden have very strongly urged, that a size limit for haddock should be imposed.

Other Food-fishes.

On the cruises the catches of other food-fishes viz. flounder, dab, turbot and cod have been investigated.

Benthos.

The benthos investigations in the fjords of the West coast have been continued with the Petersen Grab and with a new grab, constructed by Professor O. Pettersson for work on hard bottom.

The result of these investigations has been dealt with by Dr. Arvid R. Molander in the following two papers:—

1) Investigations into the vertical distribution of the fauna of the bottom deposits in the Gullmar Fjord. Sv. Hydrogr.-Biolog. Kommissionens Skrifter, New Ser. Hydrography VI.

In the same paper Professor O. Pettersson has dealt with his new grab under the heading:— A new apparatus for the taking of bottom samples.

2) Animal communities on soft bottom areas in the Gullmar Fjord.

Hydrography.

On all cruises with the research steamer in the area a great deal of work has been done in order to collect hydrographical data as to salinity, temperature and oxygen content in connection with the biological investigations.

The hydrographic data are submitted for publication in the Bulletin Hydrographique Trimestriel.

BALTIC AREA

1927.

By

K. A. Andersson.

Denmark.

Investigations of the stock of plaice have been carried out off Bornholm from the Danish Biological Station's s.s. "Japetus Steenstrup" during the months of August and September. The aim of the researches was, partly to follow up the influence of the intense fishery upon the stock, partly to investigate the fluctuations in the numbers of the 0-Group and the older year classes. Fishing experiments have, therefore, been carried out both from the "Japetus Steenstrup" with a small-meshed otter seine (Eel-Tog) and from small boats on the shore with hand push net. At the same time a few hauls with ring trawl for herring larvae were made east of Bornholm; also a sample of herring caught by fishermen east of Bornholm was examined. In the month of November, 4 samples of plaice caught by fishermen north, east and south of Bornholm were examined, in order to supplement the material collected during the above mentioned investigations.

Hydrographic observations were made by the Danish Meteorological Institute at Christiansö.

Finland.

Biological Work.

Material for scale-analysis of Salmon from the Kemi, Oulu, Kymi, and Kokemäki rivers were collected and marking of young Salmon in Kokemäki river and local quantitative investigations of the bottom fauna (Tellina) have been carried out.

Hydrographical Work.

1) The regular continual observations comprise:—
   a) surface temperature daily, surface salinity every fifth day, temperature and salinity at different depths every tenth day from 26 coast stations and at 11 lightships.
   b) currents at three depths three times daily from 11 lightships.
   c) oxygen in deeper layers at Märket three times a month.
   d) registrations of sea-level at 14 coastal points.

e) records of ice conditions in journals and sketch maps at about 100 stations, and
f) records of ice conditions in the Baltic on all Finnish ships.

2) A hydrographical cruise was made in July 1927 in the Baltic north of Gothland, at which 65 stations were taken.
3) Laboratory work regarding the hydrogen-ion-concentration have been carried out.
4) The analysis of bottom samples from the Baltic have been continued.
5) Soundings in the north of the Bottenvik have been made with an echo-sounder.

Germany.

Salmon.

Under the direction of Dr. Henking, the investigations of the skeletons of salmon (*Salmo salar*) and sea trout (*Salmo trutta*) were continued during 1927 by Dr. Altnöder. This was about the first attempt to compare on a somewhat large material the different region of the spinal column of these fishes on the model of the investigations of the herring which Heincke has carried out in such a successful way. Owing to the great difficulties in the beginning in procuring a sufficient material of these large and expensive fishes the investigations have not yet been finished. The high content of fat also rendered the work very difficult. It is to be expected, however, that good results may be obtained in this way.

Professor Seligo has also made some investigations in the same direction.

Herring.

The scheme according to which Dr. Altnöder investigated the herrings in the western part of the Baltic has also been handed over to Dr. Seligo and Dr. Willer (Königsberg), as well as to Dr. Lundbeck (Neukuhren, Königsberg).

Thanks to the kind assistance of Dr. K. A. Andersson (Stockholm) and Dr. Swenander (Lund), Dr. Altnöder had an opportunity of obtaining herring samples from Skanör and Falsterbo (at the southernmost end of Sweden) on the spot for comparative investigations. Further, through the kindness of Dr. A. C. Johansen (Copenhagen) and of his assistants it was also made possible for him to investigate herring samples from Möen and other fishing-places and to learn on the spot the Danish methods of investigations.

As it is of great importance for commercial fishing to obtain information as to the races which the herrings on the coast of Rügen belong to, samples of 200 individuals of ripe spring spawning as well as of ripe autumn spawning herrings were examined according to the simplified Heincke's method. In order to render it possible to make a comparison between the herrings of Rügen and those of the Sound, the same race characters were chosen which Johansen used in his investigations of the herrings in the Sound. In order to augment the material the investigations are to be continued next year.

Marketable Pleuronectids.

Investigations have been carried out concerning the stock of marketable pleuronectids and the influence of the intense so-called Bornholm-fishing on same. Investigations have also been started with the aim of determining a size limit of the plaice and flounder in the middle and eastern parts of the Baltic.

In order to increase the stock of fish in the western part of the Baltic, transplantations of North Sea plaice to the Baltic have been made according to the wish of the fishermen. The fishes were liberated in the bays of Eckernförde and Neustadt and a number of them were marked. During the first period a good number of these fishes were recaptured. In the winter no fishes have been recaptured. This may, however, be due to the fact, that in this season plaice is not being fished for in this district.

In spite of Dunker's investigations we are not quite clear as to the local races of the plaice and flounder in the Baltic, and therefore race investigations on both these fishes have been started in the western as well as in the eastern part of the Baltic. The great material of young flatfishes in our possession is also to be used in these investigations.

Investigations of the young stages of flatfishes.

In all, there are 389 catches now in hand from the Baltic coast from Eckernförde to Neukuhren from nearly every month of the year. The closer investigations of this great material have not yet been finished. It may be merely mentioned as a remarkable fact that young plaice 50—70 mm. in length were discovered in fairly great quantities on the coast of East Pomerania where up till now such young stages of plaice were unknown. It is remarkable, that at the investigations in the same localities about the same time the year before no young plaice were caught.

During the autumn of 1926, on the other hand, a great number of young stages of turbot appeared, whereas there were none during 1927. These observations refer to fluctuations of the stock of fish, but nothing definite can be stated about this problem, until the investigations have been carried on for a longer space of time. It is also remarkable that the 0-group appears at different times in the western and the eastern Baltic. While the 0-group of the flounder is to be found as early as May off the coast of Schleswig-Holstein, it does not appear until October and November off the coast of East Pomerania and East Prussia. This fact is remarkable especially in the case of East Pomerania, as the spawning in the Bornholm basin and in the western part of the Baltic takes place during the same months.

Haddock.

The occurrence of the haddock in the western part of the Baltic was further observed. Of special interest was the occurrence of ripe haddock during the spring of 1927 at Eckernförde. Further, the fact may be mentioned, that of the haddock a few individuals belonging to the 0-group could be observed during the autumn of 1927.

Latvia.

Statistics.

Statistical work has been regularly continued for 67 districts. Data are received about: a) quantity and value of fish landed monthly for all districts, b) number of fishermen who have perished at their work, c) value of fishing tackle lost at sea. Information is also compiled about the number of fishermen, the number and value of fishing tackle (boats, fishing nets, fishing hooks) and the number of seals killed in every district.

Data for 1926 are compiled and published by the Ministry of Agriculture in the third statistical yearbook "Bulletin statistique des pêches maritimes de Lettonie — Année 1926". The data for 1927 are ready for publication.

Biological work.

The collection of a great number of Salmon scales for investigation of age, growth and immigration was continued by special stations for Salmon observation. 4 stations in the Daugava (Düna); 2 — in the Salace (Salis); 1 — in the Gauja (Livl. Aa). The examination of salmon scales collected in former years has been carried out at the Fishery Laboratory organised by the Fishery Board and the results will be published shortly. The investigations of *Coregonidae* have also been continued at the Fishery Laboratory.

The collection of Plankton from ships along the Latvian seashore, the Baltic and the Gulf of Riga, is continued. Also plankton samples are collected at the hydrographical coast station of Kolka (Domesnäs).

Hydrographical work.

Regular observations regarding the height of water level are carried out at Liepaja (Libau), where a mareograph (system Seibt-Duess) was installed in September 1927, Ventspils (Windau), Kolka (Domesnäs) and Daugavgriva (Dünamünde).

Observations regarding the ice conditions have been made from coast stations.

Hydrographical observations (height of water level, temperature and salinity at the surface and at different depths) are carried out by four coast stations, at Liepaja (Libau), Ventspils (Windau), Kolka (Domesnäs) and Mersrags (Markgrafen).

The collection of water samples from ships along the Latvian seashore, the Gulf of Riga and the Baltic, has been continued.

Poland.

The investigations already mentioned in the report for the previous year were carried on in several directions:—

1) A short general study of the action of the changes of hydrographical, meteorological and also biological conditions upon the fishery in Polish territorial waters was published by Mr. Demel.

2) Daily observations of the temperature of the sea near the eastern point of the Peninsula Hel were continued.
3) The first series of investigations of the population of flounders, made by Mr. Borowik and Mr. Dixon in the Polish waters was concluded. The aim of these investigations was the study of the year-classes, of the growth and of the life history of the flounder.
4) Special attention was paid to the study of the salmon and the sea-trout:—
   A) The Vistula-salmon was studied near the spawning-places in the rivers Dunajec and Skawa. Materials for the anatomical and racial studies were collected.
   B) Studies of the hydrographical and biological conditions in the rivers near the spawning-places of the salmon and the sea-trout were continued by Prof. Spiczakof.
   C) Marking experiments with young salmons and sea-trouts were continued by Mr. Kulmatycki.
   D) An expedition for the purpose of studying the salmon and the sea-trout in the river Reda, descending directly to the Baltic Sea, was organised by Mr. Borowik and Mr. Dixon.
   E) Studies of the nature and the development of the hybrids between the sea-trout (*Trutta trutta*) and the freshwater trout (*Trutta fario*) were carried on by Dr. Skowron and Dr. Ramult.

Sweden.

General.

During the year under review a continuity of the work was maintained, precedence being given to researches on the herring and plankton and on the general physical conditions in the different parts of the Baltic. But also sprat, cod, plaice and flounder were investigated.

The Research Vessels.

Investigations at sea were carried out by the Research vessel "Skagerak" and by the Motor Boat "Eystrasalt".

The following cruises were completed:—

With the "Skagerak":

1) 20th May—20th June: the southern Baltic—the Middle area of the Gulf of Bothnia —the Middle Baltic—the Gulf of Riga—the southern Baltic. The main purpose was to make a survey of the distribution of the animal plankton and of the hydrographical conditions; trawling experiments and collecting of fish-larvae.

2) 19th—28th October: to the southern Baltic. The distribution of autumn herring broods and trawling for plaice investigations.

With the "Eystrasalt":—

5th July—20th August: along the Swedish coast from the southern part to the northern area of the Gulf of Bothnia. Investigations of the herring, cod and plankton.

23rd August—11th September: along the southern Swedish coast and to Gothland. Marking experiments on eels; investigations on sprats, flounder and plankton.

12th September—15th October: the Middle Baltic and the Gulf of Bothnia. Investigations on herring, sprat, cod and plankton.

8th—15th November: the south part of the Swedish coast. Investigations on the sprat and plankton.

Herring.

The herring investigations were continued on the same lines as during the previous year. A number of samples of autumn-spawning herring from different parts of the Swedish coast were collected and examined as to the age composition.

Dr. Chr. Hessle has given a short account regarding the age composition of the Baltic herring in 1926 (Biological Statistics regarding the Baltic autumn-spawning herring, Journ. du Conseil, Vol. II, Nr. 2) and Dr. K. A. Andersson has treated the same problem in: "Från 1926 års fiskeriundersökningar i Östersjön" (Fishery investigations in the Baltic in 1926) in Svensk Fiskeritidskrift 1927.

It was shown that the herring fishing in the Baltic in 1926 for the main part was based on the old year classes from 1917 and 1918 and on the year class from 1922. The first named year classes had on the whole lost very much of their previous importance, especially in the middle and southern part of the Baltic. As the fishery in this region on the Swedish side in 1926 was very poor, it was judged that the year class from 1922 could not be very abundant. For that reason it was not to be expected that the herring fishery in 1927 should be a rich one.

In the Gulf of Bothnia the two old year classes were during the year 1926 still fairly abundant and the herring fishing was good in that area.

In 1927 the old year classes from 1917 and 1918 were nearly exhausted. They could be traced only here and there.

It was further stated, that the year class from 1922, which was relatively plentiful in the catches during 1926, in reality must have been rather poor. It was not at all predominant in the catches of 1927.

If there is no other predominant year class, a young class, even if poor, can constitute a large part of the stock and of the catches. This was the case with the year class of 1922 in 1926. In 1927 it could hardly be traced in the catches. Only in two samples from the most northern part of the Baltic area and off Stockholm did it constitute a more dominant proportion.

As a rule it can be said that during 1927 the main part of the herring fishing was based in the southern Baltic on the year class of 1924 (3 years old), in the Middle Baltic on the year classes of 1924 and 1923 (4 years old) and in the Gulf of Bothnia on the year classes 1923.

During the visit to the Gulf of Riga in June we examined a sample from the south-east coast of the Island Ösel, and through the courtesy of the Director for the Fisheries in Latvia Mr. Miezis, a herring sample from the inner part of the Gulf of Riga was sent to me at the end of November. These samples are, however, not sufficient

to give a good idea of the age composition of the stock of herring in the Gulf of Riga or to render possible a thorough study of the racial characteristics and the rate of growth.

The herring fishery along the Baltic coast of Sweden was a little richer in 1927 than during 1926, but it was by no means a rich one. The young year classes of three and four years of age seem insufficient to give rise to a big fishery.

A great number of the Baltic herring has been investigated as to their food in different parts of the Baltic area.

A report as to the investigations of the distribution of young larvae of autumn spawning herring in the southern Baltic is given to the Administrative Report of the Transition Area Committee.

Sprat.

Fishing experiments were carried out in order to study the sprat population along the Swedish coast. According to these investigations the stock of sprat was not large.

A great number of eggs have been collected on the cruises in June east of Gothland.

Cod.

As previously stated, the cod spawns in the Sea of Åland and in the southern part of the Gulf of Bothnia. But hitherto we have not succeeded in finding the eggs or fry of the cod in these areas. In the year 1927 a great deal of work has been devoted to this matter. We had purchased from Heligoland a special kind of net suited for work along the bottom. But in spite of many experiments in the Sea of Åland and in the Gulf of Bothnia we have not succeeded in fishing cod eggs or fry and they are still unknown in these regions.

On the cruise in June eggs and young larvae were collected in the middle part of the Baltic.

For the study of the age composition of the stock, scale samples were taken from different parts of the area.

Plaice.

In the Bornholm region a large material was collected on the cruises in May and October in order to study the influence of the intense fishery on the stock of plaice. A report thereon is given to the Administrative Report of the Transition Area Committee.

Flounder.

During the cruise in June a great number of larvae were collected in the Gothland region. The biology of the flounder was also studied on the coast of Gothland.

Eel.

In order to obtain a more detailed knowledge of the migration of the eel along the Swedish coast, 200 specimens were marked at each of two stations. Thirtyone of these were recaptured and give information of great interest as to the small local deviations from the main direction of the eel migration.

Salmon.

For further investigations on the life history of the salmon in the Baltic, scales were collected in the southern part of the area.

In the years 1925 and 1926 Dr. G. Alm marked a great number (6000) of young salmon, 14—18 cm. in length, in the rivers Ångermanälven and Indalsälven in the northern part of Sweden. Of these, nine specimens were recaptured in 1927 on the coast of Poland, Germany, Denmark and on the southernmost coast of Sweden. Through these marking experiments it has been clearly proved that the salmon migrates in the Baltic very far from the river where it is hatched. This fact is evidently of very great importance as regards the protection of the salmon fishery in the Baltic area.

Plankton Investigations.

During the cruises mentioned, plankton investigations have been carried out, in accordance with the programme, adopted at the Council Meeting in 1926, at a great number of stations in different parts of the Baltic. In continuity with the plankton work commenced in 1925, the collected samples are worked up in order to ascertain the fluctuations in the quantity of animal plankton from year to year and in the different seasons of the year. As I have pointed out in the paper previously mentioned, the fluctuations of plankton can be quantitatively very great at different localities in the Baltic area and this fact has probably a great influence on the distribution of the stock of herring.

During the visit to the Gulf of Riga in June we were able to establish the interesting fact, that the animal plankton life in this Gulf was very much the same as in the Gulf of Bothnia. In both these areas *Mysis relicta* and *Limnocalanus Grimaldi* are predominant. These animals, the biggest planktonic schizopod and copepod for the Baltic area, are apparently of great importance as food for fishes, especially for herring. Dr. S. Vallin, who preliminarily examined the plankton samples, was also able to show, that the specimens of *M. relicta* in the Gulf of Riga were in general unusually large.

The greatest depth in the Gulf of Riga is 49 m. The inlet to the Gulf is narrow and shallow (20—25 m.). The Gulf is thus separated from the Baltic. Outside the mouth of the Gulf quite different animals predominate in the plankton than on the inside of the threshold. This similarity between the animal plankton in the Gulfs of Bothnia and of Riga, so far situated from each other, may perhaps be explained by the resemblance in the hydrographic conditions in both areas. A comparison of the following hydrographic series taken in June 1927 may be of interest:—

Gulf of Bothnia, near the Finnish coast
61° 30′ N.—21° 0′ E. 8th June

Depth	Temp.	Salinity ‰
47 m.	2.98	5.75
30 -	3.88	5.68
15 -	4.99	5.57
0 -	6.15	5.57

Gulf of Riga.
57° 5′ N.—23° 24′ E. 18th June

Depth	Temp.	Salinity ‰
49 m.	3.03	5.70
40 -	3.34	5.63
30 -	3.59	5.54
20 -	6.59	5.35
15 -	7.31	5.35
10 -	8.81	5.28
0 -	9.49	5.26

It is noticeable, that the salinity is nearly the same in both areas. Outside the threshold in the mouth of the Gulf of Riga the hydrographic conditions were greatly different, as will be seen from the following series:—

57° 38′ N.—21° 28′ E. 16th June.

Depth.	Temp.	Salinity ‰
35 m.	5.25	7.27
30 -	5.55	7.30
15 -	7.28	7.20
0 -	9.70	6.94

In my paper referred to above, I pointed out, that the herring fishing in the year 1926 was very poor along the Swedish coast of the Middle Baltic, but in the Gulf of Bothnia it was rich. According to the statistics for Latvia the herring fishing in the same year outside the Gulf of Riga was poorer, but within this Gulf it was richer than during the previous year. In the area off the coast of Latvia the same circumstances prevailed in the herring fishing as on the Swedish side of the Baltic and the Gulf of Bothnia. This Gulf and the Gulf of Riga show accordingly a resemblance also concerning the herring fishing. In 1926 the animal plankton (*Limnocalanus*) in the Gulf of Bothnia was very abundant but in the Middle Baltic it was poor. I suggested that the great variation in the stock of herring in the two areas could be explained by the difference in the abundance of plankton. In 1926 we had no opportunity of collecting any plankton samples in the Gulf of Riga, but if this Gulf resembled the Gulf of Bothnia as regards the abundance of plankton even in 1926, my suggestion as to the variations in the stock of herring in different areas is all the more likely to be correct. These important problems, which I have touched upon now require further investigations.

A great deal of work has been devoted to the study of the life history of the Mysiids, their distribution and food.

Hydrography.

On all cruises hydrographic observations as to temperature and salinity have been carried out in conjunction with the biological work. The oxygen content has also been determined at stations where the depth is great. The temperature and salinity records are submitted for publication in the Bulletin Hydrographique Trimestriel.

Continual observations have been made from lightships along the Swedish coast and off the north-western coast of Gothland and on this down to a depth of 80—100 m.

Report of the Limnological Committee.

1927.

By

H. Henking.

Denmark.

The limnological work in Denmark in connection with the investigations of the International Council in the year 1927 has concerned the following subjects:—

1) Salmon. In the month of April 200 young salmon from hatcheries were marked with silver needles (Da 1901—2100) and liberated in the river Skernaa in the West Jutland. Some of the salmon were 2 years and some 3 years, and their length varied from 14 to 26 cms. The main object of the experiment was to study the migrations of the fish and especially to get information as to whether the majority of the fish after a sojourn in the sea will return to the rivulets of West-Jutland.
2) Sea Trout.
   a) The age and rate of growth has been studied in sea trout from various localities, especially from the river Gudenaa.
   b) There has been made an investigation as to the size of the sea trout ascending the river Gudenaa, in order to get information as to whether the trout of the present day, which in the main originate from hatcheries, have the same size as the trout in the period when the stock in the main originated from natural spawning places in the Gudenaa or its tributaries (before the year 1919).
   c) Various rivulets in Jutland have been investigated in order to point out the places which are best adapted to the output of fry.
3) Coregonus. There has been made an investigation as to the distribution and frequency of *Coregonus oxyrhynchus* in the rivulets of West-Jutland.

Finland.

Investigations on the year classes of *Coregonus albula* in lakes Keitele and Pyhäjärvi. For investigations on the Salmon, see the report of the Baltic Committee.

Germany.

The investigations on the Baltic salmon have been continued, especially as regards the skeletal system and the scales. These investigations have been extended so as to include sea trout and trout.

An inquiry has been set on foot to ascertain which hatcheries are at the present time exercising the artificial fecundation of salmonids. The object of this is to

establish the origin of the progeny. As regards the salmon (*S. salar*) and the sea trout (*S. trutta*) it is intended thereby to investigate whether it is a question of a pure separation of the species or whether an interbreeding of the species occurs, and if so to what extent.

Great-Britain.

During the past year the work has been mainly concerned with pollution due to Beet Sugar factories. This is an industry of recent origin in this country and it has been found that the waste waters cause serious damage to fisheries.

The effects of the effluent from one Beet Sugar factory upon the fauna and flora of a stream have been intensively studied. Observations have now been made during two campaign seasons as well as throughout the intervening recovery periods.

The Factory in question is capable of handling between 1200—1500 tons of beets a day. The waste waters, which are somewhere in the region of $3^1/_2$ million gallons daily, comprise washing and process water etc., and there is no separation. Before being run into a river the waste waters are passed through a drum screen; after liming they are subjected to "rough filtration" through gravel and then are run into two large sedimentation ponds whence they run direct into the river.

The effects of this effluent upon the stream has been traced by means of chemical analyses, particular attention being paid to the oxygen concentration, the ammonia content, hydrogen-ion concentration, etc. A number of complete analyses has been made and a series of mud samples examined.

In addition the diurnal variations in the oxygen and ammonia content and in the p_H have been traced during twenty-four hours in each month. Considerable fluctuations have been noted which can be correlated with the photosynthetic activity of the green plants.

The results of one series and the main findings may briefly be summarised as follows[1]):—

1) On March 30th, 1927 the dissolved oxygen content of the river shewed a remarkable periodic variation between 0.795 and 1.803 parts per 100,000, i.e. between 65 and 157 per cent. of saturation of oxygen at the temperature of sampling.
2) At 7 p.m. the water contained 0.01—0.015 parts N per 100,000 ..... From 8 p.m. until 11 p.m. the increase in ammoniacal nitrogen content was rapid, and after 11 p.m. it increased still more rapidly, reaching a maximum value of 0.165/100,000 at 2 a.m. ..... After 5 a.m. the values obtained fell very rapidly until 1 p.m., the minimum value of 0.01/100,000 was reached at 3 p.m.
3) During the period of observation the reaction of the water changed slightly between p_H 7.6 and 8.0.
4) Day:— Photosynthesis by plants causes assimilation of carbon dioxide and liberation of oxygen while decay of organic matter produces ammonia which is re- Night:— Photosynthetic production of oxygen ceases, and the ammonia produced by the organic decay is not removed. Animal and plant respiration continues,

[1]) Butcher, Pentelow and Woodley. Biochem. Journ. Vol. XXI, No. 4. 1927, pp. 945—957.

moved by the high concentration of oxygen, resulting in: Oxygen maximum Ammoniacal nitrogen minimum p_H value maximum.

taking up oxygen and producing carbon dioxide resulting in: Oxygen minimum Ammoniacal nitrogen maximum p_H value minimum.

One of the most striking effects of the pollution is the enormous production of sewage fungus. Data have been collected from many rivers in this country and considerable information of a systematic character has been obtained. In addition the conditions of growth, both in nature and the laboratory, have been closely studied.

The presence of enormous masses of this fungus constitutes a grave nuisance to users of the river. Further, its deposition in quiet stretches and in back-waters gives rise to beds of evil-smelling mud which, by decomposition, reduce the oxygen content. The actively growing fungus too has been found to favour silting.

In view of the important rôle played by green plants in maintaining the oxygen supply a detailed study has been made of the cryptogamic and phanerogamic flora.

As far as the phanerogams are concerned an ecological survey of the whole river has been completed and it has also been possible directly to ascribe certain changes in the flora to the pollution. It was found that the stream, in common with other small rivers examined, possesses virtually no true plankton but that there was a very abundant flora of sessile algae. These sessile forms have attracted very little attention hitherto and special study of them has been made. A method of collection has been devised which gives satisfactory results and it has been possible to trace the periodicity both of individual species, by enumeration, and of mass production, by weighing.

Regular observations on the fauna of selected reaches have been made and the associations occurring in gravelly and muddy reaches determined, together with the seasonal numerical fluctuations of the individual species. The results have been compared with those obtained from an un-polluted river and it has thus been possible to ascribe certain changes to the pollution. It has been found that this is very unfavourable to those forms that normally inhabit the gravelly reaches, but that the mud associations are little affected. But this group of organisms, too, will, in extreme cases, be replaced by those forms that normally occur in the foul mud deposited from the effluent.

Irish Free State.

A Report on the Age and Growth of the Salmon of the R. Shannon during 1924, 1925 and 1926 has been prepared and is now in the press.

Collections of salmon scales from a number of rivers have been made for the purpose of similar studies.

Investigations of the growth of brown trout and sea trout in relation to their environment have been made.

Latvia.

The head of the Fisheries Department, Mr. V. Miezis, has sent in a report "Provisional Report on the occurrence and the catching of Salmonids in the Latvian coastal waters and inland waters" which has been written by the fishery official Mr. William

Mannsfeld. It is shown therein that of *Salmo salar* and *S. trutta* about 75,000 kg. are caught in the coastal regions and 110,000 kg. in the inland waters.

The chief fishing centres for the sea fishery lie in the mouths of the Salace (Gulf of Riga), the Daugava (Düna), and the Ganjathe (Gulf of Riga), the chief fishing villages being situated by the mouths of the Gauja and the Daugava. The salmon fishery of Ventspils (Windau) has developed greatly in recent years.

Detailed information is given regarding the separate fishing areas and particularly the catch in the inland waters.

Poland.

The programme of investigations drawn up by the Limnological Committee in previous years was carried out in the following particulars:—

The investigations of the hydrographical and biological conditions in the uppermost parts of the river Dunajec near the spawning places of the Vistula-Salmon, were carried out by Prof. Spiczakof and his assistants. The chemical conditions of the water, the fauna and flora of the river and affluent rivulets were studied; these studies will be continued next year.

In October and November 1927, during the season of activity of the Salmon-hatchery at Nowy Tavg, near the spawning places of the Vistula-Salmon racial studies on the salmon and sea-trout bred in the hatchery, were carried on; material for the anatomical and morphological studies and also for the scale reading was collected. 129 salmon were measured by Smith's method and photographed; scales, vomera, the first gillarches and pyloric appendages were preserved for further investigations. 194 other salmon were studied morphologically only. The variability of salmon eggs was studied by means of exact measurements.

An expedition for the study of the salmon in the small river Reda which flows directly to the Gulf of Puck (Baltic Sea) was organised by Mr. Borowik and Mr. Dixon for the purpose of studying the methods of fishing in the river and near its mouth, the time and nature of the migration of salmon in this river and the character of the salmon and sea-trout population in this part of the Baltic and in the river itself. The object of this study was the introduction of protective measures for the salmon and sea-trout in this territory.

For the purpose of studying the migration of the salmon and sea-trout, 1229 young sea-trout and salmon (1140 being one year and 89 two years old), marked with a small hexagonal silver plate with the letter P and numbers, were put in the river Brda (an affluent to the Vistula). These young fish were reared in ponds belonging to the Institute for the Scientific Agriculture at Bydgoszcz.

About 1,000,000 young (4 months old) salmon and sea-trout were put into the affluents of the Vistula with a view to increasing the population of these fish in the river and in the sea.

A preliminary agreement between Poland and Czekoslovakia, concerning the protection of the spawning places in the rivers on the frontier between these two countries, was concluded.

Studies concerning the biological character and features of the hybrids between the sea-trout (*trutta trutta*) and freshwater-trout (*trutta fario*) were carried on by Dr. RAMULT and Dr. SKOWRON. The details concerning the effects of the cross-fecundation were studied; the rate of development and growth of the hybrids was controlled; material for cytological studies was collected; the resistance against the action of salt-solutions upon the hybrids from the first stages of their development was studied. It is intended to use these hybrids, after one or two years, for the marking experiments.

A study concerning the corregonid fish in the Polish waters was published by Dr. W. KULMATYCKI.

Sweden.

For investigations on the life history of the salmon see under "BALTIC AREA" p. 162.